The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXV. No. 646 November 14, 1931 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0

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NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street. London, E.C.4), are closed on Saturdays.*

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

Tars and Oil from Coal

THERE has just been issued by the staff of the Fuel Research Station a further report entitled "A Study of the Tars and Oils Produced from Coal" (H.M. Stationery Office, pp. 123, 2s.). The results of the work on low temperature tars have been prepared for publication in four parts, the first dealing with statistics, the second with the treatment of tar from a full scale retort, the third with the carbonisation data from three typical bituminous coals, and the fourth with the variation, by temperature of carbonisation, of the properties of the tars from each coal.

It is recalled that in the early stages of the coal gas industry, coal was carbonised in iron retorts and the range of temperature was similar to that now used in low temperature carbonisation. The change from this to the high temperatures now adopted was the result of a prolonged economic struggle, one important factor of which was the great industrial importance of the products to be obtained by the distillation of high temperature tar. There is a continuous and growing demand for these products, and combined with the advantages of coal gas as a source of heat and the success that has attended the production of high temperature cokes possessing greater activity, this would suggest that the amount of coal carbonised at high temperature will continue to increase steadily.

Up to the present coal treated by low temperature processes is still a relatively small proportion of the total amount carbonised. In spite of definite progress in the study of low temperature methods the process has obviously a long way still to go. If, however, low temperature tar or oils were produced in large quantities it might affect the demand for products in the petroleum oil industry, the Scotish shale industry, and the coal gas and coke oven industry. But, again, these facts are matters for the future. It is pointed out, incidentally, that the crude tars from low temperature carbonisation, in common with those from high temperature carbonisation, are not miscible with petroleum oils in all proportions. When petroleum fuel oil is added to low temperature tar, a deposit is formed which varies in constituency from a soft plastic to a hard pitch-like material in accordance with the type of petroleum oil added. This, of course, is a serious disadvantage, and the conversion of low temperature tar into a product that would mix with petroleum in all proportions would add obviously to the cost of the tar.

As against this, it has been found that low temperature tars can be used for certain special purposes for which the commercial value would be considerably enhanced. These special uses would provide an outlet for only a limited quantity at present, but it is thought that when low temperature tar has been investigated more completely the number of these special uses may be extended. The report contains a vast amount of statistical and other information of great interest to the serious student of the subject, but it leaves one with the impression that the low temperature process is still in a comparatively early stage of development and that much further research is necessary to decide what its ultimate position may become.

Chemical Employment and Salaries

SOME figures published by the Institute of Chemistry in its October journal reflects to some extent the conditions in the chemical industry during the past year. During the twelve months ended September 30, 1931, the total number of vacancies notified was 490 as compared with 746 in the previous corresponding period. There was a marked falling off in the number of such notifications during the last three months. The majority of the notifications concerned industrial chemists, amounting to 220, nearly half of the total. In many of the vacancies prospective employers asked candidates to state the salary they required. In ten cases, the amount was £200 per annum, in 30 between £200 and £250, in 64 between £250 and £500, in 12

between £500 and £1,000, and in 5 over £1,000. The total number of members using the appointments register has risen from 310 in October of last year to 424. A table of the number of members who have informed the Institute that they are unemployed is interesting. In October, 1930, the number was 91 as compared with 62 in October of the previous year. This rose to 104 in December and had slowly advanced to 114 by May. From that time the figures have steadily increased to the latest figure of 160. Of this total, 45 appear to have been unemployed for three months or less, 77 for from three months to one year, and 38 for over one year. At the date of the committee's report the total membership of the Institute was 5,950, and the percentage of unemployed has therefore increased from 1.5 per cent. to nearly 2.7 per cent.

Adsorption of Gases

THE periodical discussions organised by the Faraday Society have long been known for the value of the contributions they bring to the study of new scientific problems. The discussion arranged for January 12 and 13 at Oxford will deal with the general question of "The Adsorption of Gases," and it promises to be of the usual comprehensive character, with contributors from the United States, Germany, and several British Universities. Professor Hugh S. Taylor, of Princeton University, who is now on a visit to England, will contribute the general introduction, and it may confidently be expected to be equal to the occasion. In Section I, dealing with "Experimental Methods," Professor E. K. Rideal, who has collaborated with Professor Taylor in many studies, particularly relating to catalysis, will be responsible for the introductory paper, and further contributions have been arranged from Professor J. A. Becker and Mr. C. J. Davisson (New York), Dr. F. P. Burt (Manchester), Mr. B. Lambert (Oxford), and Professor F. G. Tryhorn (Hull). "Kinetics and Energetics" is the subject selected for Section II, and Professor Freundlich (Berlin) will present the introductory papers, with a group of further papers by German, British and American authorities. "Theories of Adsorption," the subject of discussion in Section III, will be introduced by Professor Polanyi (Berlin), with Professor P. P. Ewald (Stuttgart), Dr. R. H. Fowler (Cambridge), and Professor Lennard-Jones (Bristol) to follow. Dr. Robert L. Mond, as president of the Faraday Society, will introduce the foreign members and visitors individually to those present. As usual, the papers and the discussion thereon will be published, probably about the middle of March, and should be a valuable addition to the long series of such reports issued by the Society.

The Cosach Inquiry

IT is impossible to say at present what the effect on the Chilean nitrate industry will be of the report of the official sub-committee appointed to investigate the formation of Cosach, the national amalgamation of all Chilean nitrate producing companies. The report criticises severely the methods by which the Cosach scheme was promoted and the financial and other terms of the amalgamation. It even goes so far as to describe the scheme as "a very sad affair for national economy and fiscal interests." It speaks of the possible annulment of the whole scheme as "lawfully feasible," on the grounds that certain proceedings were unconstitutional and because of certain alleged irregularities. These conclusions may, of course, be well or ill-founded, but in any case such a re-opening of the whole situation cannot have any favourable effect on the industry at present. Further, if the proposal to rescind the scheme takes a serious form, it would inevitably throw the whole organisation of the nitrate industry into the melting pot, and no one can foresee what might be the results to the industry of such a step. Developments will naturally be keenly followed in Europe, where production of synthetic sulphate of ammonia is mainly centred. According to the latest information received from Santiago the report of the Government Commission is to be considered by technical experts before any action is taken. It therefore appears unlikely that any of the recommendations of the Commission will be acted upon before January next.

Books Received

A STUDY OF THE TARS AND OILS PRODUCED FROM COAL. Department of Scientific and Industrial Research Technical Paper No. 32. London: H.M. Stationery Office. Pp. 124. 2s.

PHYSICAL CHEMISTRY. By Louis J. Gillespie. London: McGraw-Hill Publishing Co., Ltd. Pp. 287. 16s. 6d.

INDUSTRIAL ELECTROCHEMISTRY. By C. L. Mantell. London: McGraw-Hill Publishing Co., Ltd. Pp. 528. 30s.

The Calendar

November 16	Institute of Chemistry (Leeds Section): Annual Meeting. "The Food and Drugs Act, 1928." A. R. Tankard.	Leeds
16 - 21	Third International Conference on Bituminous Coal.	Carnegie Institute of Technology, Pittsb'gh.
18 - 20	Ceramic Society: Autumn Meeting.	London.
18	Society of Dyers and Colourists (Midlands Section): "Patent Law." H. E. Potts. 7.30 p.m.	Technical College, Derby.
18	Society of Glass Technology. 2 p.m.	Sheffield.
19	Chemical Society. 8 p.m.	Burlington House, London.
20	Society of Chemical Industry (Glasgow Section): "The Abstracting of Chemical Literature." Professor J. C. Philip. 7.30 p.m.	St. Enoch Hotel, Glasgow."
20	Society of Chemical Industry (South Wales Section): 'Dyestuffs and Biological Activity." Dr. J. H. Quastel. 7.30 p.m.	Technical College, Cardiff.
20	Royal Institution: "Oil and Petrol from Coal." Dr. C. H. Lander. 9 p.m.	21, Albemarle St., London.
20	Society of Chemical Industry (Liverpool Section): "Nature's Variations on the Isoprene Theme." Professor I. M. Heilbron. 6. p.m	University, Liverpool.
20	Society of Dyers and Colourists: "Random Leaves from a Viscose Yarn Dyers' Notebook." C. M. Whittaker. 7 p.m.	36, George St., Manchester.
20	Institute of Chemistry. 14th Streatfeild Memorial Lecture. "Recent Advances in the Fermentation Industries." Dr. J. Vargas Eyre. 8 p.m.	30, Russell Square, London.
21	Oil and Colour Chemists' Association (Manchester Section): Annual Dinner and Dance 7 p.m.	"Manchester, Ltd."

Recent Developments in Activated Carbon

By M. Schofield, B.Sc., A.I.C.

Methods of utilising activated carbon in solvent recovery processes have been established for some years. During the last few years, however, this modern adsorbent has been adopted in many other fields. This article summarises these modern developments in the study and applications of the commercial carbons.

THE insistent demand in industry for solvents, edible oils, and other commodities of water-white consistency, has increased enormously the production of so called "bleaching agents," that is to say, those agents exhibiting the property of adsorbing impurities which reduce the marketable value of the finished product. Activated carbon is a modern example of such purifying agents; and by virtue of more economical working, simplicity in process, and the fact that no secondary chemical product remains in the liquid under treatment, the method of bleaching by adsorption is ousting the older purification processes involving distillations, recrystallisations, or the addition of chemical bleaching agents. Other applications of this modern purifier in the direction of solvent recovery are too well-known to require description, but a third type of application has appeared which demands notice, viz.; the efficiency of activated carbon as an industrial catalyst.

Forms of Activated Carbon Available

As a result of these various uses, a large number of commercial forms of activated carbon have appeared on the market and may be classified according to their origin into the three types: animal, vegetable, and mineral carbons. Under the first heading we have activated bone char, blood carbons, and leather black, while mineral carbons, which are not as yet highly developed, are derived from soot, lignite, and from the incomplete combustion of hydrocarbons. Vegetable carbons are obtained from a multitude of carbonaceous wastes, such as wood waste, peat, rice hulls, nut shells, etc. There are no better examples in chemical industry to-day of the conversion of an apparently valueless waste into a marketable product of high utility. To illustrate this point the processes of the Industrial Chemical Sales Co., Inc., may be mentioned, in which six standard grades of Nuchar carbons containing no less than 90 to 97 per cent. of the element are produced from the residues of sodium sulphite liquors in the cellulose industry. The residues are carbonised and then activated in an electric furnace in which the carbon serves as resistor; while more recent patents of the concern (U.S. Pat. 1,634,477-8 and 1,634,480) give the use of steam and carbon dioxide in an electric shaft furnace.

From rice hulls are prepared the Carbrox carbons, and from wood waste quite a number of brands are derived including the British products named Bonnite carbons. An important British concern engaged in the manufacture of shuttles and bobbins, for instance, has acquired patent rights for a process in which wood chippings are passed through retorts via helically-grooved conveyors, the waste being impregnated prior to carbonisation with the calcium acetate liquor from a wood distillation process. Creosote oil and the acetone from the decomposition of the calcium acetate are withdrawn below 450°, and the charred mass then passes to a zone in the neighbourhood of 1,000°, thereby yielding a high grade activated carbon. It has been suggested some time ago that the wood distillation industry might combine the production of activated carbons with the primary activities; for although the distillation retorts are not designed to withstand temperatures much in excess of 400°C (which is too low for activation purposes), yet the raw material and gases for activation of carbons are on the spot and a special retort seems to be the only requirement. The use of the uncondensable gases from wood distillation for such a purpose is included in the claims of a recent patent (U.S. Pat. 1,753,984).

The Activation Process

All the major activation processes consist in heating the initial raw material or a previously charred product to temperatures above 750° or 800°C, after treatment with activating agents of a mineral or gaseous nature, or both of these. Chlorides or other salts of zinc, iron, calcium, and ammonium, and free phospheric acid, are examples of impregnating agents for activation, while steam, nitrogen, and oxides of carbon are common activating gases. The nature of the activation process has received various explanations, the most prominent of which are those which hold that activating gases effect the removal of complex hydrocarbons which are absorbed in the pores of charcoals obtained by simple carbonisation. Similarly, the inorganic impregnating compounds are stated to prevent the deposition of hydrocarbon complexes on the active pore surfaces. The activation of carbons for catalytical use is believed to be dependent on the removal of carbon atoms from the pore surfaces of the original charcoal to yield an irregular lattice structure which constitutes the active surface of the catalyst. This view is in accordance with the observation that the most efficient carbon catalysts are those prepared from a wood charcoal by an oxidation activation; for removal of carbon atoms from a regular surface is probably effected only by an oxidation process.

In addition to these studies of the mechanism of the activation processes, laboratory research has been carried out on every conceivable property of the material, such as the determination of the sizes of individual pores, and even of "flash points." The two subjects which are of significance as regards activities on a large scale are the studies of adsorption of vapours by the carbons and of methods of testing relative efficiences. From the first of these subjects has come the general conclusion that almost any vapour or gas can be recovered from a gaseous mixture provided the conditions such as correct temperature are favourable. This is already exemplified by a proposal (Brit. Pat. 316,888) to adsorb, at low temperatures, acetylene and ethylene from gaseous mixtures containing methane, hydrogen, etc., and then to regenerate by evacuation in the cold for ethylene or by evacuation and heating in the case of acetylene.

The methods proposed for testing carbons in the laboratory are numerous and may be grouped into three classes corresponding to the three types of application of the adsorbents in practice, viz; adsorption of colloidal or non-colloidal solute from various solvents, adsorption of vapours of high M. W. from gases, and thirdly, determination of the catalytic activity by a small scale study of the particular reaction to be carried out. Although in general a granular carbon will be found to give appreciable positive results in all three methods, yet it must be borne in mind that carbons are marketed for one or other of the first two types of processes, the catalytic carbons having as yet no individual place in the market. Examples of adsorption tests for those carbons which are to be used in the treatment of liquids are: the adsorption of iodine from solution in potassium iodide or in organic solvent, adsorption of phenols, amines, dyestuffs, etc., from aqueous solution or organic solvent, and the decolourisation of neutralised beet sugar molasses. In each case the carbon is removed by filtration and the filtrate examined by analytical or colorimetric methods. An alternative suggestion when working with light solvents is to substitute settling of the carbon in order to eliminate adsorption factors due to the filter paper.

Adsorptive Efficiencies

The order of adsorptive efficiencies is usually found by different methods to be the same for a chosen list of carbons, although some exceptions have been reported, one explanation being that large molecular complexes are not adsorbed efficiently by carbons with very fine pores. The value of a carbon in practice can be determined only by preliminary tests followed by trial on a fairly large scale, and many methods proposed as standard have little worth when it is borne in mind that the degree of adsorption depends on the amount and nature of other colloidal or non-colloidal material in solution, and on the pH value. For this reason the molasses test using a solution of known pH value appears to be favoured. On a large scale the ease of filtration, possibilities

of repeated regeneration, losses due to mechanical handling, and the bulk or specific weight of the carbon, are important factors. Two claims of superiority: the first postulates that a carbon with the lowest density (10 to 15 lb./cu. ft.) of any on the market is most advantageous in use, while the second holds that a density of 25 lb./cu. ft. is the highest of all and is the important feature. Both products will be economical in different fields: for whereas a light carbon usually indicates a higher adsorbing surface per unit area and a high degree of approach to pure ash-free carbon, a denser product may yield advantages in regard to transportation costs, smaller losses due to mechanical handling, and smaller capacity of adsorber unit or filter-press required.

Purification of Potable Water

For some years the treatment of drinking water with activated carbon has been seen in the small household filters, while use of the adsorbent on a large scale in removing excess chlorine from municipal supplies treated with this agent has been a feature of the Candy De-Clor Filter System for over twenty years. Further recent examples have appeared in Chicago and Cleveland, U.S.A. The chlorination treatment of the municipal supplies was found to yield a bacteria-free water which possessed a disagreeable odour and taste due to chlorphenols derived from traces of phenols in the original supply. Both this type of impurity and excess chlorine were completely eliminated, thus furnishing an important application of the efficiency of the carbon in adsorbing halogens, an efficiency recognised for many years in laboratory work. Equally difficult problems were experienced at Hamburg, N.Y., where bad taste and odours proved to be seasonable in type, varying with the nature of algae which predominated at different periods of the year. The addition of 0.05 to 0.07 grains of activated carbon per gallon proved a successful measure in this case.

Sugar Refining and Oil Refining

An interesting method of effecting economies in supplying refined cane sugar to food manufacturers has appeared in America. It is well known that a sugar refinery produces a colourless syrup from raw sugar and converts this syrup into pure crystal by processes which add appreciably to the market price of the finished product. This conversion of refined syrup to sugar is completely reversed in factories which manufacture sweet foods, preserves, and canned fruits, for the sugar is invariably dissolved to obtain a syrup. The innovation of supplying a highly refined syrup or "liquid sugar" sold on degrees Brix and delivered to the door of the food factory has been introduced by Refined Syrups, Inc., of New York. For the attainment of success in the conversion of raw sugar liquors into refined odourless syrups a high order of adsorption is demanded, and activated carbon in the form of Suchar Carbon has fully satisfied expectations in this direction. Transportation of the product of the refinery is effected by road tank-lorry or rail tank-car which delivers directly into the storage tanks of the purchaser.

The use of activated carbon in conjunction with adsorbent earths for the refinery of edible oils is increasing. An analagous application has appeared recently in the production of a white, odourless lard in the meat-packing industry. It has been established that the last traces of foreign odour and of reddish tints can be eliminated by treatment with carbon. The advantages of this treatment are: the tendency of the adsorbent to minimise adverse effects such as rancidity due to adsorption of oxygen by the lard, the extraction of moisture by the carbon, the lower temperature required for the decolourisation process, and the effect of certain carbons in removing traces of acid constituents in the lard.

Purification of Air and Gases

Activated carbon enters into three types of processes for treatment of gases and vapours, viz: (i) processes in which adsorbed constituent and on-going gas are to be utilised, (ii) processes in which the gas (usually air) is run to blow-off valve and only the adsorbed constituent is required, and (iii) those in which a gas is to be freed from impurities of no commercial value. The natural gas industry of U.S.A. and of Central Europe, and the de-benzolisation and de-sulphurisation of coal gas and coke-over gas, are examples of the first type, while the solvent-recovery processes in the celluloid, leather-cloth, and cordite industries illustrate the second type. Under the third section may be grouped the applications of the material in gas-masks during war and peace. Recent examples of interest have appeared such as the removal of objectionable odours evolved from glue and fertiliser works, and the purification of air in public halls. Treatment of gases other than air is exemplified by the plant introduced by a Leigh firm for the purification of the carbon dioxide evolved from brewery vats. Generated from materials of a high order of purity, this gas would appear to be ideal for the mineral water trade; but disagreeable taints due to vapours of amyl alcohols, etc., are in evidence in the evolved gas and are successfully removed by a carbon unit with a bed of 4½ ft. in depth.

Use in Dry Cleaning

Repeated use of the batches of solvents in dry cleaning is an obvious economical necessity, as is also a cheap and efficient method of regenerating each batch to give a "white" liquid ready for further use. Traces of staleness or of foreign odours in a regenerated solvent cause similar objectionable effects in the garment passing through the process. Research work on the elimination of this evil has been carried out during the last few years by the U.S. National Association of Dyers and Cleaners, and has resulted in the adoption of a modification in the alkali method of cleaning solvents. Two types of solvent clarifiers were converted recently to a new system using activated carbon, 5,000 gallons of solvent being circulated in the test. All traces of yellow tints and of residual odours were eliminated by use of a weekly consumption of 14 lb. of carbon at first and only 11 lb. at a later stage.

Activated Carbon as a Industrial Catalyst

The synthesis of phosgene, of sulphuryl chloride, and of hydrogen chloride, are the three chief examples of modern commercial processes in which activated carbon is used as a catalyst. Other claims for the carbon as a halogenating catalyst are appearing from time to time and there are great possibilities in this direction. Oxidation of hydrogen sulphide in town gas and in water gas has been effected, while the suitability of the carbons as carriers for other catalysts is receiving attention.

This survey would be incomplete without some reference to the methods of revivifying exhausted carbons. The chief processes in use are those classified under the term "re-burning," which consist of heating the carbon to temperatures round about 900°C with or without exposure to non-oxidising gases, or of heating to a lower temperature with exposure to steam or to gases of very low oxygen content. Acid or alkali washing processes are also used in certain cases, acids like hydrochloric acid being effective in removing the higher ash-content resulting after repeated revivification, while alkali washing may be applied for removal of organic impurities. A common method in the sugar industry is to re-burn the carbon (after kiln-drying) in horizontal retorts at a temperature of 500°-600°C, the carbon passing along the retorts via mechanical conveyors, while the re-activated mass issuing from the retorts is directly suspended in water and is available for immediate use. Revivifiers of an electric furnace type have been marketed for some period by the manufacturers of Suchar Carbons, the essential features being a vertical, revolving, cylindrical furnace fitted with stationary electrodes which serve as agitators. A small amount of air may be admitted in order to effect combustion of organic impurities when the carbon has been used in the sugar industry.

Gloves for Chemical Industry

AFTER prolonged tests under a variety of working conditions Macinlop of Manchester announce the production of new industrial gloves and gauntlets designed for the use of workers in artificial silk, dyeing and bleaching, the chemical industry, chromium plating, tanning and electrical and general engineering. "The gloves, which are seamless, are made from latex rubber," states a Macinlop official, "and they represent a considerable improvement on all existing types of rubber gloves for strength and durability and for the safety of the workers concerned. A number of the tests have been conducted in chromium plating works where the treatment to which gloves are subjected is extremely hard. In each case they have been found to be perfectly satisfactory.

Modern Technical and Artistic Glass

Developments and Research exhibited at the Science Museum

AN Exhibition of Modern Technical and Artistic Glasses is being held at the Science Museum, South Kensington, and will remain open until the end of the year. This exhibition which was formally opened by Sir Richard Gregory, October 21, has been organised by the Society of Glass Technology and the Glass Research Delegacy of the University of Sheffield, and is intended to illustrate the most striking results of research in glass technology during the past fifteen years.

Work of the past Fifteen Years

Immediate attention to the problem of glass was essential as soon as the war broke out, and efforts to produce chemical glassware and to extend the production of optical glasses were immediately set on foot. The work of the Committee of the Institute of Chemistry, and in particular that of Sir Herbert Jackson, will be long remembered in connection with the development of chemical glassware. At the same time research upon the subject was instituted at the National Physical Laboratory, and the results proved to be of fundamental importance. The recognition of glass technology as a science, however, may be dated to the founding, in 1915, of the Department of Glass Technology in the University of Sheffield, organised by Dr. W. E. S. Turner, who five years later was appointed to the professorial chair. During its short lifetime this Department has published nearly 250 papers and reports, embodying the results of research work, has also exercised very considerable influence on practically all the later movements in connection with the technical side of the glass industry. For instance, it led to the formation of the Society of Glass Technology in 1916, a society which has become international in character and with more than 40 per cent. of its membership spread throughout some twenty-seven countries of the world.

The Department of Glass Technology and the Society of Glass Technology have had considerable influence on developments in Germany. In 1922-23, a department for the study of glass was set up at the Technische Hochscüle, Karlesruhe, and the Deutsche Glastechnische Hochscüle Gesellschaft came into existence. The officers of this Society have frankly said that they were largely influenced in the founding and work of their Society by that of the English Society. Co-operation has been established between the two Societies, in regard to the setting up of standards for testing glass, and this co-operation is being extended to the American Society. As the result of systematic research our knowledge of the chemistry and physics of glasses has also been very greatly extended. This knowledge has resulted in the production of quite a number of new types of glasses and in the constant improvement of old ones.

Effects of Heat Treatment

In general, the exhibition may be said to illustrate the relationships between the chemical composition and the physical properties of glasses, with indications of the industrial results of the researches involved. Fourteen sections are employed in classifying the subjects dealt with. Section A comprises a review of the most important literature on glasses (excluding works on optics and optical instruments) which has been published since 1915. Sections B to E are concerned with fundamental properties of glasses; F to O illustrate how the results of fundamental researches on the relationships between chemical composition and physical properties have been utilised in recent developments in the production of specific types of glasses, the types dealt with including coloured glasses for artistic and utilitarian purposes; optical, chemical, heat-resisting, illuminating, and electrical glasses; sheet and plate, safety or laminated, and fused silica glasses. Specimens, photographs, and numerous diagrams of data are employed to convey information to the visitor.

In Section B, devoted to the nature of glass, the study of the equilibrium diagrams of the complex systems in which glasses fall, and remarkable specimens of crystallisation from glasses are shown. The effect of heat treatment on crystal growth is set out pictorially. A whole case is also devoted to the most modern methods and results of the study of the nature of glasses by the X-Ray method. Section C contains many interesting specimens, Roman, medieval, and modern, which have undergone weathering and decay as the result of unsuitable composition; and modern researches which have shown the way to produce very durable glasses are described and illustrated. Section D is devoted to certain physical properties of glasses. Particular attention is also paid to modern work on the thermal expansion; and in this sub-section are shown examples of graded glass seals which enable a glass of low thermal expansion to be united to one of high expansion through intermediate joints, and of glass to metal joints. Types of fracture produced by thermal and mechanical forces are exhibited in a special series of specimens.

Colouring and Decolourising

The most spectacular part of the exhibition is Section F, which deals with the colouring and decolourising of glasses. The six cases devoted to this subject stand in the entrance hall of the Museum. Some beautiful specimens of coloured Egyptian glasses of the Eighteenth Dynasty are shown in the first case. Below them, and extending to the second case, are numerous specimens, specially melted at the Department of Glass Technology, Sheffield, to illustrate the tremendous range of colouring materials available to the modern glassmaker. More effective illustrations of colouring than these are the specimens of artistic glasses. Amongst the more striking colouring agents in the artistic glass exhibited are selenium (various shades) and the oxides of didymium, neodymium, and praseodymium. The utilitarian division of Section F includes such objects as Crookes glasses, various protecting glasses for furnace workers and welders, signal glass, and colour filters. In Section M (sheet and plate glasses), reference is made to research on coloured glasses suitable for keeping away flies. Toughened glass samples appear in Section L, and are also referred to in Section E and J. The nature, methods of manufacture, and sources of defects in " safety " or laminated glass are set out in Section N. The neighbouring Section O, devoted to fused silica, contains a number of historical specimens, as well as others showing that massive, as well as small, objects of fused silica are now obtainable.

Three cases are devoted to optical glasses and one to optical lens systems. One of the most important advances has been the improvement in transmission both in the ultra-violet and in the infra-red brought about by painstaking efforts to reduce the iron oxide content. A massive speciment shown contains only 55 parts of iron (calculated as metallic iron) per million of glass, and it is claimed that British optical glass is now superior to any other in regard to transmission at both ends of the spectrum.

The Future of Cosach in Doubt

Reported Support for Dissolution

CONFLICTING reports as to the fate of Cosach, the $300,000,000 Chilean nitrate concern, controlled by the Guggenheim interests, continue to come to hand. Last Saturday it was understood that the special Commission of Deputies investigating the structure of the combine was ready to produce an unfavourable report declaring that the organisation of Cosach was unconstitutional. Guggenheim Brothers, however, denied that the Government had received the report and also refuted the suggestion that the dissolution of Cosach was recommended. This announcement has now been followed by a message from the Santiago correspondent of the Associated Press which states definitely that the dissolution is recommended, unless changes are made to take the industry out of the hands of foreigners.

The President-elect of Chile, Senor Montero, has withheld comment on the findings of the Commission, but has stated that the Republic should never have permitted foreign control of national industries nor the association of foreigners as partners in such industries. He added that the changes made by the ex-President Ibanez in the law governing the formation of the Cosach combine were irregular.

The Sweating of Paraffin Wax

By H. L. Allan

Modern practice in the sweating of paraffin wax is described in the following paper which was read at a meeting of the Institution of Petroleum Technologists on Tuesday, October 13.

PRIOR to the advent of the Henderson stove, the methods of treating paraffin scale had advanced through several stages. In Scotland, in the shale oil industry, the crude paraffin scale was diluted with naphtha and moulded into cakes; these were pressed, expelling oil and soft paraffin dissolved in the naphtha.

Sweating was introduced by Hodges, of Price's Patent Candle Co., Ltd., who observed solid scale lying on the ground exposed to the sun gradually becoming whiter. He moulded cakes of scale, placed them on racks covered with matting, and heated the chamber in which the racks were housed until the desired degree of purity was obtained. The sweating of cakes on racks, however, did not produce a uniform quality, as the colour of the finished cakes lacked uniformity. Hence the work of discharging the wax from rack stoves by hand was increased by the fact that selection had to be made at the same time to produce a product which could be efficiently and economically bleached by subsequent treatment. The moulds were air cooled in buildings of considerable area, and the temperature variations and the rate of circulation of air, in addition to the manner of filling the moulds, all contributed to establishing differing physical conditions in the moulded cakes.

The Henderson Stove

The Henderson stove was a great advance on this old method of sweating, and gradually developed to the deep pan type of apparatus used to-day by the major portion of the industry. The great technical advantage of the Henderson stove was the increase in the mass of the cake, allowing greater uniformity of cooling and sweating. The reduction in labour and fuel, the reduction in area of site required and in the buildings accommodating the plant, were economical advantages. The stove consisted of a number of trays, usually 10 or 12, about 30 ft. long, 6 ft. in breadth and, say, 8 in. deep, containing in each tray a false bottom of wire gauze about 2 in. from the actual bottom. These trays were carried on a steel framework and supported at several points to avoid sagging, and the whole structure could be tilted by elevating screws placed at one end of this carriage. The assembly was accommodated in a masonry building suitably lagged and fitted with steam or water heating grids, and air circulation was promoted by suitable ventilation or later by artificial or mechanical means.

The method of operation was to bring the trays parallel with the floor by means of the screws, fill up the trays to the gauze level with water and then with the liquid crude paraffin scale. The wax in the trays was gradually cooled by the circulating air and, a later development, by circulation of water through coils placed in the wax space. When cooling was complete the apparatus was tilted to run off the water, leaving the paraffin as a solid cake supported by the gauze. The temperature of the compartment was then raised by means described and sweating proceeded. When the quality of the residual wax on the gauzes in each tray had attained the quality desired, free steam was introduced into the compartment and the residue melted out. Technically, this system was fairly good, but not by any means foolproof. The larger masses made for greater uniformity in cooling and sweating, but not absolute uniformity. A common trouble was a skin of hard paraffin on the surface which consisted apparently of a system of crystals, generally described as foliaceous, which exuded oil to the surface, and the latter could not find an exit through the mass during sweating. To assist the passage of this oil the operator had to spear the cake during the sweating process, so facilitating drainage. The use of water to support the wax cake also promoted troublesome emulsions and introduced solid impurities, the open tray admitted dust and was subject to cooling irregularities, and the apparatus was messy, permitting losses through drainage which were difficult to recover.

The Alanmor Stove

The Alanmor stove was designed with the object of providing an apparatus that would be foolproof even in unskilled hands, and one in which most of the operations could be controlled mechanically if desired; a completely enclosed apparatus to which foreign matter in air or water could not be introduced; complete control of cooling and sweating throughout the mass; compactness; elimination of thermal losses, as far as is possible; and as a heat exchanger system, of closed type, giving maximum fuel economy.

In the latest type there are, in the containing vessel, seven compartments 30 in. in depth, each compartment containing fourteen horizontal coils of $\frac{3}{4}$ in. pipe at 2 in. pitch. Each coil is offset to the coil above and below, so that when the mass of paraffin sits around the coils, it is held in four point suspension, which prevents undue sagging during sweating. In existing tubed pan sweaters the coils are vertically above one another, leaving an unsupported mass of paraffin between each nest of pipes to the depth of the mass of wax in the pan after the full charge has contracted in cooling. There is also a vertical pipe through the centre of the stove used for charging and for the effiux of sweats and finished wax, and on the outside of the tank or stove there is a vertical header pipe communicating with the top of each compartment, which serves to release the air displaced during charging and to admit air during cooling and sweating. The internal steam pipe in this header controls the temperature of the air admitted, and also keeps the overflow of the charge in the liquid state until it is drawn back into the stove during cooling. The whole apparatus is covered or lagged by 3 in. cork slabs, and finished externally with cement; it is quite unnecessary, therefore, to enclose the stoves in a building.

Method of Operation

In operation water at a few degrees above the melting point of the charge is circulated, and the charge is admitted at the top of the stove through the central pipe, the bottom valve of which is closed. The wax passes into each cell from the bottom upwards by way of the central pipe and the slots on the floor level of each cell, whilst the displaced air passes away through the common air header at the side. When the stove is full the water is lowered in temperature and cooling begins, and when the charge is sufficiently cooled, the bottom valve on the central pipe is opened and the contents cleared out: a little steam may be required on the internal steam pipe to effect this. At the same time the temperature of the circulating water is gradually raised and sweating begins, and is continued until the tests of the effluent indicate that the operation is completed. The run-off connection is then switched to finished wax receivers, free steam is admitted at the bottom and top of each cell and the wax melted out.

The following table gives figures from the plant installed by the Burmah Oil Co.:—

Input per stove—42 tons.
Average cycle time—41 hours.
Capacity per unit per month—260 tons (average 190 tons).
Steam for melting and heating water—960 lb. per ton finished wax.
Steam for heating tanks and lines—1,060 lb. per ton finished wax.
Water used—19,800 per galls ton of finished wax.

One plant of 30 stoves, capacity over 5,000 tons, finished wax per month, covers with all its tanks, heat exchangers and de-oxygenating plant an area of 200 ft. by 100 ft. The heat exchangers are of the usual type and are introduced to prevent access of air to the circulating water and to economise fuel; in both respects they are thoroughly efficient, and the de-oxygenating equipment—a tank filled with iron turnings—is a refinement fitted in case of leakage. Coil stoves have been four years in commission and there is no sign of the slightest corrosion. Without heat exchangers and a closed system or a deaeration plant these coils would have perished in a year. Condensing water in the East, especially in the latitude of Rangoon, contains up to 500 parts of oxygen per 100,000, and is consequently highly corrosive in a closed system working around 140 to 150° F.

The Present Trend in Inorganic Pigments

A Future for New Colours

The following extracts are from the first of a series of survey lectures, arranged by the Manchester branch of the Oil and Colour Chemists' Association to deal with different branches of the chemical industry from the point of view of the oil and colour trade, delivered by Mr. Noel Heaton, president of the Association, on November 6.

In recent years pigments, placed on the market long ago in an almost haphazard manner, had been subjected to an increasingly stringent process of investigation as to their suitability for various purposes, and the present state of the industry was largely the result of the law of the survival of the fittest. At one time zinc whites were looked upon as nothing more than inferior substitutes for white lead. It was not until the discovery that zinc oxide could be employed to produce essentially new types of finish that it began to make headway as having an individuality of its own. The same principle applied to lithopone which received its great impetus by the development of another type of finish to which it was pecularily adapted, namely, the water paint or "washable distemper," for which white lead was wholly unsuitable.

At the present time there is no *ideal* pigment on the market. The line of development of a new material should therefore be, not to compete in the direction in which existing materials had proved satisfactory, but to study their respective merits and defects, so that the use of the one could supplement the other. For years a controversy had waged between those who maintained that white lead was the only satisfactory pigment for the production of paint, and those who clamoured for its total abolition in favour of zinc oxide. It was a great gain to-day to find this policy of mutual exclusion dying down in favour of a recognition of the value of new pigments without prejudice to the appreciation of the qualities of the old. Zinc oxide, for instance, had derived great impetus from its application to the rubber industry, where white lead was at a disadvantage owing to its inevitable reaction with free sulphur.

White Lead and its Alternatives

To-day there were three types of white lead available—stack process, quick corrosion process, and precipitation process. There were slight variations in the three types which rendered them each peculiarly suitable for some specific purpose. The tendency of conservatism in the industry was to argue that because a new product did not conform exactly to previous experience it must be useless. On that basis one was generally told in the old days that unless a white lead was a genuine stack-made white lead it was no good. The supposed inferiority of a white lead made by any other process still persists in some quarters, but it has never been possible to demonstrate this. Increasing numbers of paint manufacturers used both types of white lead side by side, and when the slight foundation for the prejudice in favour of stack lead became more generally understood the process would become obsolete. Meanwhile one recognised that the various methods of manufacture in vogue resulted in differences in the physical nature of the product which rendered them suitable for different purposes. Thus, slack lead was most suitable where low oil absorption and easy wetting power was required, as in paste paints, whilst quick process white lead was preferred in those cases where a high oil absorption and more uniform texture was desirable, as in ready-mixed paints. Precipitated lead was required chiefly where brilliant colour and high bulking value were wanted.

Attempts had been made to introduce other lead compounds as white pigments, such as the sulphite and chloro-sulphite, but the only pigment of that class that had attained even a temporary place was basic sulphate of lead, introduced in 1879 as a "non-poisonous white lead." Apart from new pigments a great feature of modern practice had been the development of a number of grades or varieties of the same pigment to suit the requirements of different industries. With zinc oxide, for instance, the chief considerations in the paint industry were colour and opacity, and the pigment was graded accordingly. In the rubber industry zinc oxide was used not so much as a colouring agent as for influencing the mechanical properties of the rubber. Sulphide of zinc was practically unknown as a paint pigment until about five years ago, although used to some extent in other industries, notably in rubber, chiefly for colouring ebonite.

Titanium White

The climax in white pigments as applied to modern progress was reached ten years ago with the introduction of the whites derived from the oxides of antimony and titanium. The titanium pigment in particular had opened up fresh lines of development on account of its hitherto undreamt-of obliterating power, due to the combination of an abnormally high refractive index, with a low specific gravity. This property, combined with insolubility in acids, and resistance to heat, had rendered possible the development of white pigments in many industries for the production of effects hitherto unobtainable.

The antimony colours had suffered an even more decided eclipse in modern times as far as the paint industry was concerned. Red sulphide, or antimony vermilion, which was introduced as a cheaper substitute for mercury vermilion, soon became obsolete with the advent of "vermilionettes" but was taken up by the rubber industry. It had been the staple pigment for the production of red rubbers for many years, but recently there had been a pronounced tendency, even in this direction, to abandon it in favour of specially prepared oxides of iron.

Blue and Green Pigments

A characteristic modern development had been the practical disappearance of the numerous blue and green pigments derived from copper. The sole survival was emerald green. It had a brilliant colour, difficult to replace, but its pronounced poisonous nature, combined with instability against sulphur gases and difficult working quality, was steadily driving out of existence in favour of organic pigments.

Coming to chromium oxide, and its derivatives, which was formerly too costly for general use, users of pigments were already well acquainted with the uncertainty of matching greens in distemper and the result of the average green paint applied to new plaster. Green pigments had always been a problem, not only to the paint manufacturer, but in any industry where exposure to chemically active conditions was involved. Chromium oxide, however, provided at present the only really light, fast and chemically stable green pigment, but it was such a degraded colour, so deficient in staining power. If only one could find some method of altering its physical structure, so as to give it the brilliancy of, say, a mid-Brunswick green, without imparing its durability, it would form an almost complete solution of the problem. The colour could be very much enhanced by preparing it in the hydrated instead of the anhydrous form. Another chromium oxide pigment, made by decomposing barium chromate with sulphuric acid, and calcining, formed a composite pigment analogous to lithopone. This pigment seemed to offer great possibilities in modern practice, more particularly from the point of view of cost, if its formation were carefully studied in the light of modern experience.

The Future for Cadmium

Almost the exact antithesis to this chromatic series were the cadmium colours, which offered the most likely field for further development in the near future. In recent years the supply of metallic cadmium had been so plentiful that the cost has fallen sufficiently to bring them within range as an industrial proposition. Cadmium sulphide provided a range of yellow closely similar to the lead chromates. They were attracting more and more interest as paint pigments for special purposes where the limitations of chromes were most acutely felt, and where cost was not of paramount importance; for instance, in stoving enamels, printing inks, and cellulose lacquers. An extension of this colour range to bright red was more recent. The red was remarkably stable, resisting heat sufficiently to be used as a ceramic colour. It was also the chief pigment used for the production of a brilliant red in enamelled iron.

The Structure of Cellulose

A New Model Suggested

A JOINT meeting of the Manchester Sections of the Society of Dyers and Colourists, the Society of Chemical Industry, the Institute of Chemistry and the Manchester Literary and Philosophical Society was held at the College of Technology, Manchester, on Friday, November 6, when a lecture entitled "The Significance of the New Cellulose Model in Relation to the Technical and Dyeing Properties of the Fibre," was delivered by Dr. Herman Mark. Mr. F. Scholefield presided.

Introducing the lecturer, the Chairman said that in regard to the subject of the chemistry of cellulose Professor Mark had already established a prominent position for himself. He had also, in his connection with a very large industrial concern, made investigations into the organic chemistry of particular classes of dyestuffs and had conducted investigations with regard to new detergents and other textile assistants.

The Need for Structural Formulæ

The question of the structure of cellulose, said Dr. Herman Mark, was an old and fascinating problem of organic chemistry. Organic chemistry possessed a sort of shorthand in order to express the properties of the normal micro-organic molecular substances. When one drew the formula of analine or alizarine every chemist knew it was an expression not only for the percentage composition but also for the properties of the substance. In the case of cellulose the formula $C_6H_{10}O_5$ represented nothing like that. Something was lacking; what was it? An attempt had been made to supply the solution of the problem by the preparation of a model which appeared to be reasonably accurate. Two stages of progress had been necessary to enable this step to be taken. First, there was the very remarkable progress in the field of sugar chemistry, and for which the credit was very largely due to English chemists. They had really made clear the configuration of the glucose unit, finding that it had a ring structure consisting of 6 C atoms and 1 O atom, and there was a hydroxide group. The strong evidence of the structure of the fundamental glucose unit was not sufficient in itself to determine the problem with regard to cellulose. Another stage of progress was necessary, namely, increased knowledge with regard to the size of the atoms and the size and shape of the molecules. The most important part of this work had been done in England, more particularly in the laboratories of Sir William Bragg, in London, and Professor Lawrence Bragg, at Manchester. The accumulated result of all this knowledge on the fine structure of the single atom, combined with the progress in sugar chemistry, laid the foundation for the preparation of a reasonably good model for the glucose radicle. From this model an attempt had been made to build up a cellulose formula independently of the $C_6H_{10}O_5$.

The Grouping of "Glucose Units"

A fibre was built up of crystals or micellæ, as they were termed, in such a way that they were parallel to one another and all parallel to the fibre axis. For instance, a natural cotton or ramie fibre was built up of such micellæ, and every micelle again was built up of chains, whilst every chain was built up of glucose units in quite a distinct manner. The mercerisation of cellulose did not change very greatly the structure of the glucose unit from which was built up the cellulose. There was a slight change in the relative position of the main valency chains. There was, however, a very great influence upon the construction in the building up of the fibre from the micellæ. Firstly, it was noticeable that the micellæ which had been parallel acquired a certain degree of disorder, and it was found, also, that the cementing substances which were present in the native cellulose were removed by the mercerising treatment. It was well known that mercerising improved dyeing properties. When the micellæ were distorted, and where they were not so parallel as previously, the space between them became greater and greater, and, of course, the possibility for dyestuffs to penetrate the structure of the fibre increased.

By a combination of chemical and X-ray data a cellulose model has now been developed which agreed well with the reactions known up to the present time.

Society of Public Analysts

Elections to Membership

AN ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, on Wednesday, November 4, the President, Dr. J. T. Dunn, being in the chair.

Certificates were read from the first time in favour of Thomas Whittaker Lovett and William Charles Alfred Wise, B.Sc. Certificates were read for the second time in favour of Charles Hubert Francis Fuller, B.Sc., F.I.C., Ganesh Chandra Moitra, B.Sc., Eric Charles Wood, B.Sc., A.R.C.S., and Robinson Pearson Wood, M.Sc., F.I.C.

The following were elected members of the Society:—Raymond Merefield Edwards, B.Sc., Llewelyn John Howells, B.Sc., Donald Neil McArthur, D.Sc., Ph.D., F.I.C., F.R.S.E., James Sword, M.A., B.Sc., Ph.D., A.I.C.

Quantitative Separation of Titanium

A reliable method for the quantitative separation of titanium from tantalum and niobium was described by W. R. Schoeller, and C. Jahn. The oxalate salicylate method for the separation of titania from the earth acids, outlined in an earlier paper, has now been perfected, with the result that an almost quantitative recovery of the earth acids is achieved, and that less than one mgrm. of titania remains in the final pentoxides. The process is claimed to be accurate within 0.5 per cent. The application of the pyrosulphate tanning method to the determination of small amounts of earth acids in titania was explained, and the principles underlying the separation of titania from the earth acids were discussed.

The separation of the earth acids from metals of the hydrogen sulphide group was the subject of a paper by E. F. Waterhouse and W. R. Schoeller. In the separation of tantalum and niobium from antimony, bismuth and copper, when the mixed oxides were fused with bisulphate, the mass dissolved in tartaric acid, and the clear solution treated with hydrogen sulphide, the sulphide precipitate was always found to be contaminated with a few milligrams of earth acid. The co-precipitation is ascribed to hydrolytic decomposition of the tartaric earth-acid complexes. The separation is completed by further treatment of the sulphide precipitate: it is dissolved in strong sulphuric acid, tartaric acid and excess of ammonia are added, and the solution poured into ammonium sulphide. Bismuth and copper sulphides are precipitated; the filtrate is acidified with acetic acid, giving a precipitate of antimony sulphide. The small fraction of earth acid occluded in the original sulphide precipitate is found in the filtrate from the antimony precipitate.

Evaluation of Peppermint Oil

In their paper on the evaluation of the menthone content of peppermint oil, J. Reilly, N. Noonan, and P. J. Drumm describe a method of determining menthone as its semicarbazone. The peppermint oil is added to an aqueous solution of semicarbazide hydrochloride and fused sodium acetate, the mixture treated with 93 per cent. alcohol until clear, and then warmed on the waterbath. After standing overnight the separated semicarbazone is collected, dried and weighed. In test experiments with pure menthone the results were approximately 95 per cent. of the theoretical amount.

The determination of vanillin in chocolate and cocoa butter was the subject of a paper by D. M. Freeland. A 2 per cent. solution of ammonia in 95 per cent. alcohol is used to extract vanillin from cocoa butter, the extracts are evaporated at 70° C. to remove alcohol, the aqueous solution is extracted with ether, the ethereal extracts purified and evaporated at a low temperature, and the residue of crude vanillin dried and weighed. For chocolate, the fat is first extracted with petroleum spirit, and the vanillin, simultaneously extracted, is determined.

Studying the direct determination of nitrogen in gases, by H. R. Ambler, showed that all gases other than nitrogen are removed with only one manipulation of the sample, by (1) burning the combustible constituents in a regulated stream of electrolytic oxygen, and (2) absorbing the excess of oxygen by introducing pyrogallol into the same vessel in the presence of the gas. The residual gas, consisting of nitrogen, is then directly measured. A special combustion vessel is used for the analysis.

Trade and Travel in South America

The New Market for British Goods*

A QUOTATION from Trevelyan's History of England, "Merchant adventurers vigorously searching for new markets" furnishes the briefest possible introduction to Mr. John Benn's new book. The quotation is apposite, but is scarcely covers the whole ground, for Mr. Benn went to South America not only to seek new markets, but also to direct British manufacturers how they may extend the markets already existing on that continent. It is common knowledge that Great Britain's merchants were the first to trade with South American countries, and that they surpassed the merchants of all other nations in the extent and variety of their business. It is, perhaps, not so generally recognised that their activities were checked by the war, and that, although they have since recovered the bulk of the trade it has not shown its former resilience, and that in such markets as those of Argentina and Chile foreign countries have made greater relative progress than the United Kingdom. How this position is to be reversed, and by what practical ways and means our exports to Spanish South America can be made to regain the leaps and bounds of pre-war years, is now the problem before the British Chamber of Commerce at Buenos Aires.

Among the visitors to the Buenos Aires Exhibition was Mr. John Benn, one of the directors of Benn Bros., Ltd., the author of this book of trade and travel, in which he records his impressions and his doings during a three months' tour of 16,000 miles in February, March and April last. His main object throughout was to study commercial and industrial conditions, to furnish reports on the Exhibition and on trade generally for the journals published by his firm, and to plan the publication of *Industria Britanica*, the new and successful monthly journal in the Spanish language. To this programme, which has been fully carried out, there has now to be added the publication of "A Merchant Adventurer." This is partly a reproduction of the letters and articles written on tour; but it has been enriched by additional articles and by details of his journey and observations of men and things not heretofore published.

Merchants and manufacturers who have made long journeys abroad will doubtless in many cases endorse Mr. Benn's experiences when he writes concerning a string of ports on the West Coast:—"At all these ports one finds a particular Englishman who is the life and soul of the British community, which consists of the bank and shipping employees, and the representatives of merchant houses. Whether he is old or young, he knows everyone who matters, and in a few minutes can put the visitor in touch with an expert in any of the local trades."

Among the multifarious work which occupied the author's attention at Buenos Aires was the problem of agents. "While interviewing prospective agents on behalf of various firms," he writes, "I found that the difficulty in some lines, especially machinery, was to secure an agent who had not already contracted to handle another firm's products exclusively. It is impossible to estimate the debt which Britain owes to the agents and merchant houses in South America through which her business has been mainly conducted for a hundred years past, but there is undoubtedly a shortage of good agents at the present time." He offers a solution of the agency question by mentioning the suggestion made to him by a resident of great influence—namely, that young men of English parentage, educated in British schools in Buenos Aires, and speaking Spanish as fluently as English, should be taken as apprentices by firms in England, and there trained in technical and commercial knowledge, with a view to being appointed representatives of English firms in South America.

* *A Merchant Adventurer in South America*. By John Benn. London: Ernest Benn, Ltd., 1931. (6s. net.)

Algerian Phosphate

PRODUCTION during the first seven months of 1931 was 283,170 metric tons. Exports during the same period were 274,212 tons. Only one mine, the Cie. des Phosphates de Constantine, is at work. The stock at the mine is estimated at about 50,000 tons or one month's supply. From the figures it is clear that over-production is being carefully avoided.

Russian Affairs at First Hand

Mr. Kerensky Addresses Individualists

MR. A. KERENSKY, the President of the first Russian Republic, was the guest of honour at the forty-seventh Individualist luncheon at the Hotel Victoria, London, on Tuesday, and delivered an address on the present position of Russian affairs, based on his own intimate knowledge of the situation.

Sir Ernest Benn, who presided, said it was a unique occasion in the distinguished history of those Individualist luncheons. That table was one of the few spots, if not the only spot, where one was at liberty to speak one's mind without any affiliation or hindrance or loyalty to party of any kind.

Mr. Kerensky, in responding to the toast of his health, said that when the eyes of Europe were opened to the fact that its economic destinies were irrevocably connected with Russia it would also understand that the policy of exploitation by foreigners of the poverty and famine of the Russian population, with the aid of the dictatorship of the Bolshevists, was not beneficial but in the end must be harmful to the exploiters themselves. Germany's Russian policy and the experience of Great Britain's Labour Government was illustrative of that. The growth of the welfare of each individual country, especially one with large industrial exports, was directly proportionate to the increase of the welfare of all other countries, particularly the agricultural countries. To solve the present world economic crisis it was necessary to increase the capacity of the world's market of consumers, bringing back to it, amongst others, the 160 million consumers of Russia. Stalin's Five Years' Plan of so-called Socialist construction had once again destroyed the interior market, partially revived under Lenin's new economic policy which ruled from 1921 to 1927. Russians, deprived of their right to prosperity, had completely lost their purchasing power. Foreigners who assisted Stalin by placing credits for the realisation of the Five Years' Plan resembled those lunatics who gave willing help to Nero in the burning of Rome. He was entirely in favour of economic co-operation between Russia and England, but he was opposed to foreign intervention by the placing of credits for the strengthening of the Bolshevist dictatorship to the detriment of his people.

Turning to the internal conditions of Russia, Mr. Kerensky said the fight for bread between the Government and the population was daily becoming fiercer. Never had the regime of enforced famine and destitution been so ruthless as now in Russia. The exploitation of the peasants had led to the fact that, in spite of all the tractors and combines so loudly heralded in Europe, agriculture was again rapidly degenerating, as it did during the period of military communism. The peasantry, in their struggle for bread, answered Stalin's terror by the assassination of his agents and by the firing of the State storage of bread, and even by insurrection.

"The Chemist's Paradise"

MANCHURIA is "the industrial chemist's paradise," Professor Ralph H. McKee, of the Department of Chemistry, Columbia University, learns from Mr. Fawn S. Louie, one of his former students. Applying American ideas of efficiency to manufacture at Mukden, Louie, a native Chinese, is doing what the native population regards as "miraculous things" in reclaiming waste products. Steel, enamel, and colour, which were imported from Japan for the manufacture of enamel wash basins, are now obtained from local sources, and the scrap steel from stamping out the basins is reclaimed to make soup spoons, cups, and other small articles. Copper oxide for colouring the enamels is now made from copper shavings gathered from various brass work shops and from the Government arsenal. The cost of this copper oxide is thirty cents per lb., whereas the Japanese product costs ninety-five cents. Human labour has replaced the machine in some instances because it is not only cheaper, but provides employment, and "keeps the men out of banditry." Women and young girls are employed to inscribe Chinese characters and artistic designs on the enamel wares, and men have been substituted for mechanical jaw crushers. In fashioning by-products, hand-operated machines, a recent innovation, are used to press small articles from waste sheet steel.

Celluloid in Lacquer Manufacture

Utilisation of Old Film in Reeled Form

THE quality of the cellulose base used for the production of nitrocellulose lacquers is the subject of a brochure which has been issued by Rex Campbell and Co., Ltd., of 7 Idol Lane, London, E.C.3. Lacquers for certain uses cannot fulfil their purpose, unless they contain a generous proportion of cotton, and the claim of celluloid to more general consideration as a lacquer base is mainly on account of price, since its cost is about half the cost of cotton. By judicious use of the two materials it is therefore possible to obtain a fair compromise in the quality-price problem.

The base of early "cellulose" lacquers consisted exclusively of celluloid. They were naturally not of the quality expected to-day; but this was not so much due to the fact that their base was celluloid, as to the lack of suitable solvents and resins, and knowledge in the building up of formulæ. The chief cause of the unsatisfactory nature of these lacquers was the uncertain type of celluloid available. The cuttings and shavings, usually containing "sweepings," were of different viscosity, quality, shade of colour. Apart from the difficulty of bringing the material readily into solution, no delivery was alike, so that it was even more difficult to repeat a lacquer in respect of colour or viscosity. Celluloid film packed in bales was dirty, discoloured, or mixed with cellulose acetate film. Sometimes, due to cinema regulations in certain Continental towns, where the use of acetate non-inflammable film is compulsory, deliveries were mixed with this type of material. Moreover, the practice of inserting lengths of film of cellulose acetate in American cellulose nitrate reels resulted in mixed material when, after "cleaning," it reached the lacquer maker. These faults were chiefly due to a lack of care in sorting, preparation and packing by suppliers, Continental shippers being the worst offenders.

Cleaning Process Applied to Old Film

The fitness of celluloid film for use in lacquer manufacture rests finally on cleaning—removal of every trace of gelatine and moisture from the surface. The ill-effects of their presence in a lacquer film are well known. Removal of surface gelatine is by no means easy. The general practice used to be immersion by hand in baths, and subsequent packing into bales. This method, apart from its difficulties, carries with it the risk of parts of the film receiving insufficient cleaning —especially in those places where the strands are bent over. Although the material *appears* to be clean, small particles of gelatine cling, which are subsequently detected and removed only with difficulty. The modern method of cleaning is by the mechanical process over spools in such a way that the film after having passed very gradually through the bath is pressed on to warm moist pads, and afterwards between revolving drying towels. The material is carefully examined foot by foot as it automatically rewinds on to reels. This method removes every particle of surface gelatine and moisture, and results in a crystal-clear material.

When celluloid is packed in the form of reels, described in this brochure, the exact quantity of material required can be drawn from the bulk without loose pieces becoming detached or the risk of injury to the hands of workmen handling the material. Packing in reels is also more convenient, by reason of the saving of time and labour effected. It is also emphasised that celluloid packed by modern methods in reels, in cases, and stored under proper conditions, is no more dangerous than nitro-cellulose cotton.

Alleged Breach of Medicine Act

Action by the Crown

THE King's Bench Division on Wednesday, heard an information brought by the Attorney General against Lewis and Burrows, manufacturing chemists in which he asked, on behalf of the Crown, that they should be adjudged liable to a penalty of £10 for an alleged breach of the Medicine Act. It was alleged that the defendants at their shop in New Oxford Street, in October, 1930, sold a certain chemical preparation to be applied externally.

Sir Thomas Inskip, K.C., the solicitor general appeared for the Attorney General and said that the ointment looked like vaseline and was called a "vapour rub," and he was told that the friction of rubbing the throat and chest with it led to its having that name. It was for the use of the asthmatical and exuded a pleasant odour. It was sold in a paper box, and had on the carton the small words "P.F.1," which referred to *Pharmaceutical Formulas*.

The proceedings were under the Medicine Stamp Act, 1802-4. Even if an article was not of a proprietary nature, but a secret one, it was liable to duty as a remedy, unless it was known admitted and approved.

His lordship: Like castor oil?

Counsel: Yes, that is a good case indeed.

Dr. P. Hamill, president of the Therapeutical Society said that until he received a letter from the Revenue Authorities he had never heard of vapour rub. He had a search made by one of his experienced pharmacists. He tried to find it in *Pharmaceutical Formulas*, and the only article resembling it was chest vapour rub.

The defendants pleaded not guilty, their first witness was Mr. E. W. Goff, a chemist and a director of the company. He said that they had 24 shops in all parts of London. Each of the shops was in charge of a resident manager. They bought the oil from the Anglo-American Oil Co. in bulk, and then put it into pots. They had a meeting of their managers, and he was told that there was a big demand for a vapour rub. *Pharmaceutical Formulas* was a well known standard text book among chemists, but it was not necessarily known to doctors.

His lordship, on Thursday, reserved judgment.

Action Against a Chemical Engineer

Settlement in Court.

In the King's Bench Division on Wednesday Mr. Justice McCardie and a special jury had before them an action by Mr. John Sutherland, of Kingsway, Luton, against Mr. Horace E. Alcock, of The Knoll, Luton, to recover damages for alleged libel and slander.

The plaintiff is chief chemical engineer and works manager of B. Laporte, Ltd., who carry on business as chemical manufacturers at Luton. He complained that the defendant had falsely and maliciously charged him with falsifying the financial records of the company, for which plaintiff said there was not a shadow of foundation.

The defendant pleaded privilege and that he honestly believed the truth of the statements at the time.

After the plaintiff had given evidence, and while his witnesses were being examined, his lordship said to the defendant: You don't suggest that what you have said is true?

Defendant: I am not saying that they are true; I honestly believed them.

His Lordship: Then now is your golden opportunity. Withdraw the allegations and apologise.

The Defendant, after consultation with his solicitor, said he would do that.

Sir P. Hastings, K.C., for the plaintiff: If defendant will fully withdraw all allegations and apologise to the plaintiff, and undertake no further allegations, and to indemnify the plaintiff in costs, the plaintiff will not go to the jury and will not ask for damages.

The defendant said he would do that.

The terms having been drawn up and signed by the defendant, his lordship said they would be made a rule of Court.

Manufacture of Carbon Bisulphide in Canada

AMONG the minor but industrially important chemicals being imported into Canada is carbon bisulphide. This organic, colourless, inflammable liquid has very many uses, but in Canada its use is at present confined almost entirely to the manufacture of rayon by the viscose process. No carbon bisulphide is at present made in Canada, though its preparation could be readily affected in the electrical furnace through the union of two elementary substances, carbon and sulphur, a type of carbon well suited for the purpose being willow or birch charcoal of low ash content. The imports of carbon bisulphide increased from 65,825 lb. valued at $4,065 in 1925 to 1,855,681 lb. in 1929 valued at $83,829; the imports in the first three months of 1931 amounted to 405,707 lb. valued at $16,061. Approximately half-a-pound of carbon bisulphide is used in the manufacture of each pound of viscose silk.

From Week to Week

THE VISCOSE ARTIFICIAL SILK FACTORY at Wigton, Cumberland, has been sold by auction by Richard Hoyle and Son, of Blackburn, on behalf of the British Netherlands Artificial Silk Co., Ltd., Mr. C. A. Newton being the purchaser at £19,750.

MR. JOHN GREGORSON, general secretary of the Iron and Steel Trades Employers' Association spoke on "Industrial Accident Prevention" at a meeting of the London Safety First Council (Industrial Section) held at the Institution of Mechanical Engineers, on Monday, November 9.

NEGOTIATIONS with the German Government with a view to a subvention having broken down, the Piesteritz nitrogen works, near Wittenberg, which have been leased by the Reich to a private consortium, will now be closed. In consequence, 1,100 workmen and employees are being discharged. The Elektro A.G. will be considerably affected by this closure, as the works were one of its best consumers.

MR. C. LE MAISTRE, director of the British Engineering Standards Association, has left London on a tour of Australia, New Zealand, Canada and the United States, which he is undertaking at the request of the Board of Trade, supplemented by a direct invitation from the New Zealand Government. It is desired in that country to establish a national standardising body on the same lines as the British Engineering Standards Association.

THE LANCASHIRE STEEL CORPORATION, LTD., have begun a scheme of reconstruction of their works at Irlam, on which it is estimated that £1,250,000 will be spent. The principal aim is the installation of a new coking plant with a capacity of between 5,000 tons and 6,000 tons a week, to work in conjunction with the corporation's blast furnaces. Already over 5,000 men are fully employed at the Lancashire Steel Corporation works, largely on overseas orders.

IN CONNECTION WITH the exhibition of Technical and Artistic Glass now being held at the Science Museum, South Kensington, a series of weekly lectures has been arranged, to be given on Thursday afternoons at 4.45. Forthcoming lectures include "The Supreme Glass; Fused Silica," by Mr. R. W. Clark (November 26); "Safety Glass," by Mr. J. Wilson (December 3); "Glass in the Foodstuffs Industry," by Mr. E. A. Coed-Pryor (December 10); "Stained and Painted Glass," by Mr. James Hogan (December 17).

FOUR MEN were injured at the works of the Consett Iron Co., Consett, Co. Durham, by an explosion which occurred on Saturday, November 7. The injured men are: Mr. W. E. Ward, a manager, Mr. W. Wordley, assistant manager, Mr. R. Tucker, foreman, and Mr. W. Lowrie, blastfurnace man. The men were engaged on a gas experiment in the plate mill when a blinding sheet of flame leapt from the mouth of the burner and hurled them to the ground. The cause of the explosion has not yet been ascertained.

A JOINT MEETING of the Institute of Chemistry with the Society of Chemical Industry (Birmingham and Midland Sections) and the Institute of Fuel, was held at Birmingham University on Tuesday, November 3, when Dr. E. W. Smith, D.Sc., M.I.Chem.E., delivered an address on "The Production of Electricity from Towns' Refuse," Dr. Wardlow presiding. In the course of the discussion Mr. F. R. O'Shaughnessy (Chief Chemist, Birmingham Tame and Rea District Drainage Board) stated that at the sewage works they supplied their own power and lighting by the utilisation of methane and other gases from the sewage.

THE DIRECTORS OF TARSLAG (1923), LTD., state that the extraordinary meeting held on August 12 last, at which certain special resolutions were passed, was convened by a notice which they are advised was not technically in accordance with the new Companies Act. It has therefore been necessary to call another meeting at Wolverhampton on November 24, at 12 noon, with a view to passing again the resolutions. The proceedings, it is presumed, will be merely formal. The scheme provided for the reduction of the capital to £150,000 by cancelling 9s. 4d. of each Preference share and 7.4d. of each 1s. Ordinary share, preference share rights being abandoned, and capital increased to its former amount of £250,000.

SIR MAX MUSPRATT is now showing satisfactory improvement following his recent illness, although it was reported earlier in the week that progress was much slower than was expected.

THE THIRD INTERNATIONAL CONFERENCE on the Utilisation of Bituminous Coal, held under the auspices of the Carnegie Institute of Technology, will open at Pittsburgh on Monday, November 16, and will continue throughout the week. A detailed list of the principal papers was published in THE CHEMICAL AGE, October 31, page 384.

APPLICATION FORMS for the 1932 Associate-Membership Examination of the Institution of Chemical Engineers, which are returnable December 21, together with a memorandum on "The Training of a Chemical Engineer," may now be obtained from the Honorary Registrar, Institution of Chemical Engineers, Abbey House, Westminster, S.W.1.

DR. J. VARGAS EYRE, F.I.C., will deliver the 14th Streatfield Memorial Lecture at the Institute of Chemistry, 30 Russell Square, London, W.C.1, on Friday, November 20, at 8 p.m. His subject will be "Recent Advances in the Fermentation Industries." The chair will be taken by DR. G. C. Clayton, President of the Institute.

FRENCH PERFUME MANUFACTURERS, whose annual trade with Britain amounts to £1,000,000, are greatly concerned at their losses owing to the fall in sterling and the prospect of British tariffs. They are understood to be making overtures to British perfume manufacturers with a view to manufacturing French perfumes in Britain. One world-famous French perfume firm has been negotiating for at least 600 people. It is understood that this factory will be built on the outskirts of London.

AT THE ANNUAL MEETING of the Chemical Club, Whitehall Court, London, on Tuesday evening, the following officers were elected:—President, Dr. Herbert Levinstein; chairman of committee, Mr. W. H. Coleman; hon. treasurer, Mr. F. A. Greene; hon. secretary, Mr. J. Davidson Pratt. Executive committee: Professor J. C. Drummond, Dr. J. Vargas Eyre, Messrs. J. Blair, R. L. Collett, T. H. Fairbrother, E. Lawson Lomax, S. R. Price, S. Rackham, H. Talbot, and Dr. E. H. Tripp.

M. AARTOVAARA, formerly lecturer in analytical chemistry in the Helsingfors Technical University, has been badly injured by an explosion while attempting to isolate the newly discovered atomic element 87. His eyes were severely damaged with glass fragments, and it is uncertain whether he will regain his sight. The explosion partly wrecked the laboratory. In spite of the severe shock, M. Aartovaara was able to make a statement. He thinks the explosion was caused by the radioactive influence of the element on explosive perchloric acid. M. Aartovaara had achieved remarkable progress in his experiments with element 87, and had intended communicating the results of his work to other investigators in the United States.

THE SEVENTH ANNUAL DINNER AND DANCE of the Manchester Section of the Oil and Colour Chemists' Association will be held at "The Manchester" Limited, Royal Exchange, Manchester, on Saturday, November 21, at 7 p.m. The reception by the Chairman and principal guests takes place at 6.45 p.m. A number of well-known guests have accepted the Committee's invitation to be present, and among these are Professor F. M. Rowe, head of the Department of Colour Chemistry and Dyeing in the University of Leeds; Mr. J. H. Lester, chairman of the Manchester and District Section of the Institute of Chemistry; and Mr. Noel Heaton, President of the Association. The price of tickets for members or their guests will be 7s. 6d. each, exclusive of wines. Application for tickets should be made as early as possible to the Hon. Secretary, H. Clayton, 12 Broadway Avenue, Cheadle.

Obituary

WILLIAM SMITH HANNAH, F.I.C., of "Oak Lodge," Beddington Lane, Croydon, November 7.

EDWARD F. L. LOTTE, vice president of the National Silk Dyeing Co., of the United States. In 1920 he was appointed by the Secretary of State of the United States to represent the silk industry as a member of the Dyes and Chemicals Committee of the Textile Alliance.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

353,047. OXIDATION OF HYDROCARBONS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 10, 1930.

Hydrocarbons having boiling points above 180° C., *e.g.*, petroleum fractions, middle oils, paraffin, ceresin, naphthene hydrocarbons, or hydrocarbons obtained by hydrogenation of tars, are oxidised in the liquid state with air at atmospheric pressure in the presence of at least 2 per cent. of acids having a dissociation constant between 2.5×10^{-4} and 2×10^{-13}, such as formic, acetic, propionic, maleic or benzoic acids, boric acid or anhydride, stannic acid or antimony pentoxide. Catalysts may be present, such as resinates or naphthenates, *e.g.*, manganese naphthenate. The oxidation is stopped when a sample shows a saponification value of 70. The products consists of alcohols and some esters, and are separated by organic solvents or by crystallisation.

353,113. DYE INTERMEDIATES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 3, 1929.

A $2^1 : 2^{11}$-dinitrilo-1 : 5-dibenzoyl-naphthalene is condensed in one or more stages, with or without partial saponification, by means of sulphuric acid. Chloro derivatives may also be employed, and the method of preparing the starting materials is described.

353,124. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, May 10, 1929. Addition to 341,357 (see THE CHEMICAL AGE, Vol. xxiv, p. 354).

Mixtures of isomeric 1 : 4 : 5 : 8-naphthoylene-diarylimidazoles obtained as described in specifications 237,294, 265,232 and 265,964 (see THE CHEMICAL AGE, Vol. xiii, p. 333; Vol. xvi, p. 381 and 402) are separated into their constituents by means of their different solubilities in chloracetic acid.

353,138. DIARYL-FORMAMIDINES. Imperial Chemical Industries, Ltd., Millbank, London. Application date, May 16, 1930.

Formic acid is heated with a primary aromatic amine in the presence of boric acid or a borate and metallic iron, to obtain diaryl-formamidines.

353,193. CARBOHYDRATE ESTERS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 4, 1929.

These esters, *e.g.*, cellulose stearate, laurate, coconut oil acid ester and starch laurate, are obtained by the action of an acid halide of a higher fatty acid in the presence of a tertiary heterocyclic base.

353,260. TETRAHYDRONAPHTHALENE DERIVATIVES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, July 29, 1929. Addition to 337,289 (see THE CHEMICAL AGE, Vol. xxiv, p. 12).

An aqueous suspension of 1 : 2 : 3 : 4-tetrahydro-naphthalene is treated with formaldehyde to obtain 6-chlormethyl-1 : 2 : 3 : 4-tetrahydronaphthalene, which may be oxidised by bichromate to obtain 1 : 2 : 3 : 4-tetrahydro-6-naphthaldehyde.

353,318. ETHYLIDENE DIACETATE. Courtaulds, Ltd., 16 St. Martin's-le-Grand, London, and J. Brown, Croft House, Exhall, Warwickshire. Application date, September 20, 1930.

Acetic acid is treated with acetylene in presence of a catalyst and the ethylidene diacetate separated by agitating with sodium acetate or sodium sulphate solution, and removing the aqueous layer after settling.

353,361. AMINO ALCOHOLS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 26, 1929.

An aliphatic-aromatic ketone hydroxylated in the aromatic nucleus is treated with nitrous acid and the resulting isonitroso compound reduced. Examples are given of the preparation of *p*-hydroxy-phenyl-propanolamine and *m*-hydroxy-phenyl-propanolamine.

353,373. HYDROAROMATIC CARBOXYLIC ACIDS. Schering-Kahlbaum Akt.-Ges., 170 Müllerstrasse, Berlin. International Convention date, January 11, 1930.

An alkali salt of an aromatic carboxylic acid or substitution product is catalytically hydrogenated to obtain hydroaromatic carboxylic acid, *e.g.*, the sodium salts of phthalic acid to tetrahydronaphthalic acid, naphthalic acid to tetrahydro naphthalic acid, and naphthoyl benzoic acid to a mixture of perhydronaphthyl methyl cyclohexane carboxylic acids.

353,381. ACID ANHYDRIDES. U.S. Industrial Alcohol Co., 60 East 42nd Street, New York. International Convention date, May 28, 1930.

Acetic anhydride is obtained by treating a suspension of calcium or sodium acetate in liquid sulphur dioxide with an acyl chloride, *e.g.*, sulphuryl chloride, or with chlorine. The reaction mixture may be distilled.

353,413. ALDOLS. T. H. Durrans and F. W. Lewis, Carpenters Road, Stratford, London. Application date, March 21, 1930.

Aldehydes are condensed to aldols in the presence of an excess of normal sodium carbonate in the solid phase, and up to 25 per cent. of water. In an example, 100 parts of anhydrous commercial soda ash is treated in a closed vessel with 130 parts of anhydrous acetaldehyde and 17 parts of water below 15°C. Aldol is extracted with benzene and distilled.

353,422. DYES. Imperial Chemical Industries, Ltd., Millbank, London, A. G. Perkin, 7 Grosvenor Road, Leeds, A. Shepherdson and N. H. Haddock, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 17, 1930.

A hydroxylated anthranol derived from alizarine is treated with a tetrahalogen-thiophen simultaneously with or subsequent to alkylation, in the presence of trichlorbenzene or naphthalene. In an example, alizarine is reduced to the anthranol, which is heated with trichlorbenzene containing tetrachlor-thiophen, sodium carbonate and dimethylsulphate. The products dye green shades.

353,464. DYES; SUBSTITUTED HYDROCARBONS. G. T. Morgan and D. D. Pratt, Chemical Research Laboratory, Teddington, Middlesex. Application date, March 20, 1930.

Aromatic hydroxy or amino bodies are treated with carbon dioxide in the presence of metal halides which promote the Friedel-Craft reaction under high temperature and moderate temperature, *e.g.*, aluminium, zinc and iron halides at pressures above 10 atmospheres and temperatures of 80°-150° C. Examples are given in which phenol in the presence of aluminium chloride yields 4. 4^1-dihydroxy-benzophenone at 70 atmospheres, salicylic acid at 90 atmospheres, and diphenyl-ether at 120 atmospheres; *m* and *p*-cresol at 70 atmospheres yields *m* and *p*-cresotinic acids; *o*-cresol at 70 atmospheres yields an analogue of aurin and 2 : 4^1-dihydroxy-3 : 5^1-dimethyl-benzophenone; β-naphthol and resorcin are resinified; aniline at 60 atmospheres yields diphenylurea; ethyl-aniline at 60 atmospheres yields monoethyl-diphenylurea or *p*-ethylamino-benzoic acid; dimethyl-aniline yields *p*-dimethyl-aminobenzoic acid. In the above examples, various temperatures and condensing agents are employed.

353,307. CAUSTIC ALKALI, AMMONIUM SULPHATE, STRONTIUM OXIDE, SULPHATE AND CARBONATE. I G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 19, 1929.

Concentrated alkali solution is treated with solid strontium oxide or hydroxide, or solid alkali sulphate is added to a suspension of strontium hydroxide to obtain caustic alkali. The strontium sulphate may be converted into oxide by intermediate conversion into sulphide, or by boiling with sodium carbonate, or by treating with ammonium carbonate, and calcining the stronium carbonate.

353,407. HYDROCYANIC ACID. Imperial Chemical Industries, Ltd., Millbank, London, T. S. Wheeler, H. A. T. Mills, W. B. Fletcher, and J. McAulay, Winnington Hall, Northwich, Cheshire. Application date, February 21, 1930. Addition to 335,947 (see THE CHEMICAL AGE, Vol. xxiii, p. 532).

Specification No. 335,947 describes the reaction of methane and ammonia at 1,150° C. and a high space velocity to produce hydrocyanic acid. Deposition of carbon is now avoided by diluting the gases with nitrogen, with or without hydrogen.

353,455. ACETALDEHYDE. Gutehoffnungshütte Oberhausen Akt.-Ges., Oberhausen, Rhineland, Germany. International Convention date, April 29, 1929.

A mixture of carbon dioxide with excess of methane is subjected to repeated treatment with high frequency currents having a frequency above 10,000 per second and a voltage above 20,000. Contact substances such as quartz glass may be present. The products are acetaldehyde and formaldehyde.

353,467. ACETONE AND OTHER ALIPHATIC KETONES. British Celanese, Ltd., 22 Hanover Square, London. H. F. Oxley, W. H. Groombridge and E. B. Thomas, of British Celanese, Spondon, near Derby. Application date, April 16, 1930.

Catalysts for the production of acetone and other aliphatic ketones from acetylene and other aliphatic alcohols or their derivatives and steam are obtained by heating alkaline earth oxides or magnesia with weak acidic oxides such as heavy metal oxides, or alumina or silica. A product is obtained having hydraulic properties, which is ground and mixed with water. Thus, sodium hydroxide may be added to a solution of zinc and calcium nitrates, and the precipitate washed, dried, and calcined in an oxidising atmosphere at 1,450°-1,500° C. The product is ground, mixed with water, allowed to set, and broken up. A mixture of ethyl alcohol vapour and steam is passed over the catalyst at 365°-480° C. to obtain acetone.

353,475. WETTING, EMULSIFYING AND FAT SPLITTING AGENTS. H. T. Böhme Akt.-Ges., 29 Moritzstrasse, Germany. International Convention date, May 3, 1929.

α-Brom-aliphatic carboxylic acids containing more than five carbon atoms in the molecule are treated with alkali sulphites and the products acidified. An example is given of the treatment of α-brom-lauric acid. The products are used as wetting, penetrating, cleaning, emulsifying and foaming agents in the textile and leather industries.

353,495. COLLOIDAL COAL. Koppers Co.,Koppers Building, Pittsburg, Pa., U.S.A. Assignees of H. J. Rose, Penn Township, Pa., and W. A. Hill, 232 Sherman Avenue, New York. International Convention date, May 13, 1929.

A mixture of coal 30 parts and dehydrated coke-oven tar 30 parts is finally crushed and digested with 25 per cent. of solvent naphtha. The mixture is then treated in a mixing machine followed by a colloid mill.

353,506. DESTRUCTIVE HYDROGENATION. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30 Carel van Bylandtlaan, The Hague. Application date, April 25, 1930.

Coal, lignite, cellulose, petroleum, asphalt, tars, phenols, cresols, etc., are hydrogenated in the presence of colloidal molybdenum oxide, chromium hydroxide, aluminium hydroxide or iron hydroxide on a carrier of precipitated metal hydroxide, pumice, silica gel, diatomite, dolomite, etc.

353,507. REFINING MINERAL OILS AND TARS. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30 Carel van Bylandtlaan, The Hague. Application date, April 25, 1930.

Petroleum products, residues, and asphalts containing sulphur are purified by heating to 400° C. under pressure in the presence of hydrogen and in the presence of a catalyst of chromium or chromium compounds obtained by reducing a solution of chromic acid with hydrogen sulphide and absorbing the product on active carbon, pumice, silica gel, etc. The catalyst may also contain molybdenum oxide.

353,539. BISMUTH SALTS. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 30, 1930.

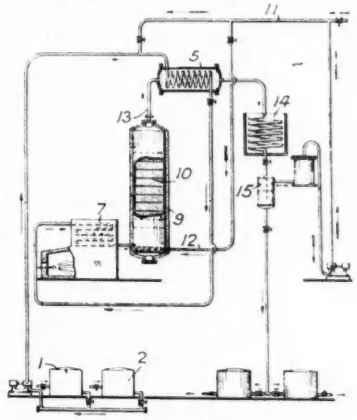
Bismuth oxide or hydroxide is treated with an acid of the formula $\begin{matrix} R_1 \\ R_2 \end{matrix}\!\!>\!\!\text{CH.COOH}$ where R_1 and R_2 are similar or dissimilar aliphatic or carbocyclic radicles, *e.g.*, phenyl-ethyl-acetic acid, phenyl-butyl-acetic acid or diethy-acetic acid to obtain therepeutic bismuth salts, soluble in fatty acids.

353,763. TREATING ROCK PHOSPHATE. Odda Smelteverk Aktieselskap and E. Johnson, Odda, Norway. International Convention date, September 28, 1929.

Phosphate rock is dissolved in nitric acid and the calcium nitrate crystallised out and converted into potassium nitrate. The mother liquor, after crystallising calcium nitrate, is mixed with potassium nitrate, neutralised with ammonia, and dried, the water being evaporated by the heat developed. The mother liquor may be freed from the remaining calcium by precipitation with sulphuric acid, sulphates, bisulphates, or fluorides.

353,792. DESTRUCTIVE HYDROGENATION AND OIL PURIFICATION. Standard Oil Development Co., Linden, N.J., U.S.A. Assignees of R. P. Russell, 167 Shelly Avenue, Elizabeth, N.J., U.S.A., and M. W. Boyer, Elizabeth Carteret Hotel, Elizabeth, N.J., U.S.A. International Convention date, October 17, 1929.

Heavy hydrocarbon oils are treated with hydrogen at high temperature and pressure in the presence of a catalyst, and the latter is regenerated when required by prolonged treatment with a solvent for tars, such as naphtha, kerosene, acetone, carbon tetrachloride or carbon disulphide. The oil passes from the tank 1, through heat exchanger 5, and preheater 7, to the catalyst chamber 9, into which hydrogen is



353,792

injected by pipe 12. Gaseous products pass to condenser 14 and receiver 15, and the hydrogen is purified and returned to pipe 11. The catalyst is purified when required by cutting off the flow of heavy oil, and substituting a light kerosene distillate from tank 2. The catalyst may be a mixture of oxides of metals of the 6th group with or without zinc or aluminium oxides, and oxides of metals of the alkali, alkaline earth or rare earth groups.

353,853. CRACKING OILS. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30 Carel van Bylandtlaan, The Hague. International Convention date, February 9, 1929.

Oils are cracked by passing them through a pipe dipping into molten lead so that the oil passes upwards through the lead to an outlet pipe. The lead is circulated continuously from its container through a heating coil in a furnace, and back to the container.

353,921. SALICYLIC ACID AND *O*-CRESOTINIC ACID. Graesser-Monsanto Chemical Works, Ltd., Victoria Station House, Victoria Street, London, F. R. Graesser-Thomas, Croeswylan Way, Oswestry, Shropshire, and E. Mather, of Monsanto-Southern Cross Chemical Co., Coventry Street, South Melbourne, Australia. Application date, April 29, 1930.

Crude solutions containing sodium salicylate are crystallised below 20° C. and the crystals washed and dehydrated in vacuo to obtain pure sodium salicylate. The crystals may be dissolved in water and acidified to obtain salicylic acid.

353,319. COLLOIDAL SOLS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, September 23, 1929.

Pigments such as titanium white, lithopone, zinc white, iron red, blanc fixe, etc., are incorporated with binders such as linseed oil, wood oil, etc., which may be thinned with turpentine, by the aid of a small quantity of a monoacyl-alkylene-diamine or an acyl-poly-alkylene-polyamine such as mono-oleyl-triethylene-tetramine, or alkylation products thereof. These substances are obtained by the action of fatty acids or esters on alkylene diamines or derivatives substituted asymmetrically, or on poly-alkylene-polyamines. Paints prepared in this manner require less binder, the covering power is increased, and grinding is unnecessary.

353,913. UNSATURATED HYDROCARBONS. T. S. Wheeler and D. Binnie, Winnington Hall, Northwich, Cheshire, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, February 26, 1930.

The pyrolysis of methane and other lower members of the paraffin series, olefines, etc., to form acetylene, etc., is carried out at high space velocities and temperatures and the heat for the reaction is provided by the simultaneous reaction of hydrogen and chlorine to form hydrochloric acid.

Specifications Accepted with Date of Application

359,419. Refining hydrocarbon oils. Richfield Oil Co. of California. May 8, 1929.

359,426. Vat-dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 8, 1929.

359,430. Ketones, Production of. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler. July 13, 1929.

359,450. Working up crude phosphate and potassium salts to mixed fetiliser, Process for. Chemieverfabren-Ges. August 14, 1929.

359,490. Organic compounds containing nitrogen, Manufacture of. W. W. Groves. (*I.G. Farbenindustrie Akt.-Ges.*). July 18, 1930.

359,491. Malleable iron-chromium alloys, Manufacture of. P. R. Kuehnrich. July 18, 1930.

359,559. Alkali metal cyanates, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). July 25, 1930.

359,568. Treating sulphide materials, Process of. S. I. Levy and H. Dering (legal representative of W. S. Millar). July 26, 1930.

359,589. Dithiocarbamates, Manufacture of. I.G. Farbenindustrie Akt.-Ges. August 8, 1929.

359,610. Arsenic acids, Manufacture of. W. W. Groves. (*I.G. Farbenindustrie Akt.-Ges.*). August 11, 1930.

359,620. Hydrogen, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). August 20, 1930.

359,652. Products containing nitrogen, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 16, 1930.

359,653. Condensation products, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 16, 1930.

359,661. Destructive hydrogenation of carbonaceous materials. Standard Oil Development Co. October 12, 1929.

359,680. Phosphate rock, Treatment of—and the manufacture of fertilisers. Odda Smelteverk Aktiesepskap. October 11, 1929.

359,681. Removal of phenols from hydrocarbons containing the same, and the recovery of pure phenols. J.Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). October 8, 1930.

359,727. Ortho-amino-para-cresol-carboxylic acid, Manufacture of. W. W. Groves. (*I.G. Farbenindustrie Akt.-Ges.*). October 29, 1930.

359,753. Dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 16, 1929.

359,755. Destructive hydrogenation of carbonaceous materials, Method of and apparatus for. H. Harper, R. Scott and Imperial Chemical Industries Ltd. November 17, 1930.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Akt.-Ges. für Stickstoffdünger. Manufacture of calcium carbide. 30602. November 4. (Germany, November 10, '30.)

Anderson, I. B. Manufacture and application of dyestuffs. 30861. November 6.

Baird, W., and Imperial Chemical Industries, Ltd. Manufacture of polyhydric-alcohol-polybasic-acid condensation products. 30622. November 4.

Beryllium Development Corporation. Manufacture of beryllium. 30344. November 2. (United States, January 3.)

Carpmael, A. (*I.G. Farbenindustrie Akt.-Ges.*). Manufacture of nitro compounds of the diphenyl series. 30467. November 3.

—— Manufacture of sulphonated nitrogenous derivatives of higher paraffin hydrocarbons. 30468. November 3.

Cheesman, T. Treatment of tar, &c products. 30687. November 5.

Condrup, C. O., and Thermal Industrial and Chemical (T.I.C.). Treatment of tar for separating aqueous liquor therefrom. 30701. November 5.

Distillers Co., Ltd., Eyre, J. V., and Langwell, H. Copper-salt compositions for treating timber, fabric, &c. 30567 November 4.

Dreyfus, H. Treatment or manufacture of aliphatic compounds. 30367. November 2.

—— Artificial fibrous materials. 30368. November 2.

—— Manufacture of aliphatic compounds. 30499. November 3.

—— Solvent treatments of cellulose derivatives. 30667. November 5.

—— Artificial silk &c. products. 30734. November 5.

—— Colouration of textile materials. 30735, 30736. November 5.

—— Manufacture &c. of condensation products. 30737. November 5.

—— Manufacture &c. of organic ethers. 30738. November 5.

—— Colouring operations. 30947. November 7.

Edeleanu-Ges. Removing paraffin wax from hydrocarbon oils. 30603. (Germany, November 4, '30.)

Hanseatische Mühlenwerke Akt.-Ges. Treatment of vegetable lecithin. 30278. November 2. (Germany, November 11, '30.)

—— Production of asphalt and tar emulsions. 30285. November 2. (Germany, November 15, '30.)

Hartley, W. Treatment of artificial silk. 30717. November 5. April 7.)

I. G. Farbenindustrie Akt.-Ges. Dyeing organic materials. 30442. November 3. (Germany, November 3, '30.)

—— Production of anhydrous magnesium chloride, &c. 30562. November 4. (Germany, December 2, '30.)

—— Manufacture of condensation products containing nitrogen. 30809. November 6. (Germany, November 10, '30.)

Imperial Chemical Industries, Ltd. Metal pylons for carrying overhead wires. 30333. November 2.

—— and Corner, G. H. C. Separable fasteners. 30496. November 3.

—— Carrying out chemical reactions. 30497. November 3.

—— and Knight, A. H. Disazo dyestuffs, &c. 30859, 30860. November 6.

—— and Thomson, R. F. Manufacture and application of dyestuffs. 30861. November 6.

Johnson, J. Y. (*I.G. Farbenindustrie Akt.-Ges.*). Manufacture of motor fuels. 30316. November 2.

—— Johnson, J. Y. Manufacture of hydrocarbons of low boiling point. 30317. November 2.

—— Johnson, J. Y. Manufacture of liquid hydrocarbons. 30318. November 2.

—— Johnson, J. Y. Manufacture of conversion products of rubber. 30319. November 2.

—— Johnson, J. Y. Manufacture of assistants for textile, &c. industries. 30433. November 3.

—— Johnson, J. Y. Apparatus for precipitating fine dust. 30434. November 3.

—— Johnson, J. Y. Manufacture of hydrogen. 30596. November 4.

—— Johnson, J. Y. Production of dyestuffs. 30795. November 6.

—— Johnson, J. Y. Manufacture of anthraquinone derivatives. 30796. November 6.

Kaselitz, O., and Uebler, B. Production of alkali nitrates. 30804. November 6.

Norddeutsche Hefeindustrie Akt.-Ges. Production of durable yeast. 20356. November 2. (Germany, July 25.)

Oostveen, W. Treatment of carbon. 30710. November 5.

Soc. of Chemical Industry in Basle. Manufacture of esters of sulphonated aromatic carboxylic acids. 30702. November 5. (March 30.)

Standard Oil Development Co. Method of preparing catalytic materials. 30769. November 6. (United States, November 29, '30.)

—— Inhibiting gum formation in low-boiling hydrocarbon oils. 30770. November 6. (United States, November 21, '30.)

Stevens, A. H. (*Merrill Super-Power System, Inc.*). Apparatus for distilling solid carbonaceous material. 30490. November 3.

—— (*Phosphate Acidulating Corporation*). Production of soluble phosphate. 30956. November 7.

Usines de Melle. Separation of fatty acids from aqueous solutions. 30488. November 3. (Belgium, November 3, '30.)

Economic Situation in Spain

A CONFIDENTIAL memorandum on the present economic situation in Spain prepared by the Commercial Secretary to H.M. Embassy at Madrid has been received, by the Department of Overseas Trade, and is being issued to firms whose names are entered on its Special Register. Firms interested in the export of British produce to Spain desirous of receiving a copy of this memorandum should apply to 35 Old Queen Street, London, S.W.1., quoting Ref. C.X.3681.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.

ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8½d. per lb., d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £15 10s. per ton; granulated, £14 10s. per ton; powder, £16 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSTUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. net d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3⅜d. per lb. ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8⅛d. per lb. d/d U.K.

SALAMMONIAC.—First lmp, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.

SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS, CAKE, GRANULAR, AND POWDER.—3½d. per lb. net d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3⅜d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SILICATE., 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 6¼d. per lb. Crude 60's 1s. 4d. to 1s. 5d. per gall.

ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 2s. 6d. to 3s. per gall. Refined, 2s. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.

ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.

BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

TOLUOLE.—90%, 2s. per gall. Pure, 2s. 3d. per gall.

XYLOL.—2s. per gall. Pure, 2s. 3d. per gall.

CREOSOTE.—Standard specification, for export, 4¾d. to 5d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.

NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 11d. to 1s. 2d. per gall.

NAPHTHALENE.—Purified Crystals, £11 10s. per ton, in bags.

PITCH.—Medium soft, 70s. per ton, in bulk at makers' works.

PYRIDINE.—90/140, 3s. 3d. to 3s. 6d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

DINITROBENZENE.—7¾d. per lb.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d.-8d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.

NITRONAPHTHALENE.—8¾d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £6 10s. per ton. Grey, £11 to £13 per ton. Liquor, 7d. to 9d. per gall.

ACETIC ACID, TECHNICAL, 40%.—£15 15s. per ton.

ACETONE.—£63 to £65 per ton.

AMYL ACETATE, TECHNICAL.—85s. to 95s. per cwt.

CHARCOAL.—£6 10s. per ton, according to grade and locality.

IRON LIQUOR.—24°/30° Tw., 9d. to 1s. 2d. per gall.

METHYL ACETONE, 40/50%.—£43 per ton.

RED LIQUOR.—16° Tw., 7½d. to 9d. per gall.

WOOD CREOSOTE.—9d. to 1s. 6d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—1s. per gall. Solvent, 3s. 6d. to 4s. per gall.

WOOD TAR.—£1 10s. per ton.

BROWN SUGAR OF LEAD.—£30 to £32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.

BABYTES.—£7 to £8 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 3d. to 3s. 6d. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON, BLACK.—3½d. to 4½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—2s. 6d. per lb.

INDIARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; Dark, 4d. to 4½d. per lb.

LAMP BLACK.—£37 to £40 per ton.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£12 5s. to £15 15s. per ton.

MINERAL RUBBER "RUPRON."—£17.

PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d. per lb.; Z.P.D., 7s. to 7s. 6d. per lb.; L.P.D., 6s. 6d. to 7s. per lb.; P.T.D., 9s. 8d. to 10s. 4d. per lb.; C.P.D., 8s. 3d. to 8s. 10d. per lb.; S.P.D., 8s. 1d. to 8s. 7d. per lb.; Suparac, Standard, 7s. per lb.; Suparac, Z, 3s. 6d. per lb.

SULPHUR CHLORIDE.—4d. to 7d. per lb., according to quality.

SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

SULPHUR PRECIP. COMMERCIAL.—£45 to £55 per ton.

VERMILION, PALE OR DEEP.—6s. 8d. to 6s. 10d. per lb.

ZINC SULPHUR.—10d. to 1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 5d. per lb.

ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.

ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.

ACID, BENZOIC B.P.—1s. 10d. per lb., for 1-cwt. lots. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £34 per ton; powder, £35 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 0½d. per lb., less 5%.

ACID, GALLIC.—2s. 9d. per lb., for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. to 6s. 3d. per lb. according to quantity. Packages extra.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%.

AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.

AMMONIUM BENZOATE.—3s. 6d. per lb.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—5s. to 6s. 3d. per lb. according to quantity. Packages extra.

ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—2s. 10d. per lb.

BISMUTH CARBONATE.—7s. 9d. per lb.

BISMUTH CITRATE.—9s. 2d. per lb.

BISMUTH SALICYLATE.—7s. 9d. per lb.

BISMUTH SUBNITRATE.—6s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 1d. per lb.

BISMUTH OXIDE.—11s. 1d. per lb.

BISMUTH SUBCHLORIDE.—10s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 4d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth sales respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W.Qts. 1s. 2d. per lb.; 6 W. Qts. 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts. 9½d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts., 9½d. per lb.

BORAX B.P.—Crystal, £23 10s. per ton; powder, £24 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES, B.P.—Ammonium, 1s. 7d. per lb.; potassium, 1s. 4d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s 6d. per lb. Prices for 1-cwt. lots.

CAFFEIN, PURE.—6s. 6d. per lb.

CAFFEIN CITRAS.—5s. per lb.

CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., according to quantity.

CAMPHOR.—Refined flowers, 3s. 2d. to 3s. 4d. per lb., transparent tablets, 3s. 5d. to 3s. 7d., according to quantity; also special contract prices.

CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.

CHLOROFORM.—2s. 4d. per lb.

ETHERS.—S.G. .730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.

FORMALDEHYDE, 40%.—30s. per cwt. in barrels, ex wharf.

GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.

HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.

HYDROQUINONE.—4s. 7d. per lb. in 1-lb. lots; 3s. 5¾d. per lb. in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.

IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz.

MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.

MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 15s. 9d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 9s. 9d. per lb., according to quantity; Liquid (95%), 8s. per lb.

MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 5d. to 8s. 6d. per lb., levig, 7s. 11d. to 8s. per lb.; Corrosive Sublimate, Lump, 6s. 2d. to 6s. 3d. per lb., Powder, 5s. 8d. to 5s. 9d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb.; Powder, 6s. 11d. to 7s. per lb.; Calomel, 7s. to 7s. 1d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 8d. to 6s. 9d. per lb.; Sulph. nig., 6s. 3d. to 6s. 4d. per lb. Special prices for larger quantities.

METYL SALICYLATE.—1s. 4½d. to 1s. 6½d. per lb.

PARAFORMALDEHYDE.—1s. 6d. per lb.

PARALDEHYDE.—1s. 1d. per lb.

PHENACETIN.—4s. to 4s. 3d. per lb.

PHENOLPHTHALEIN.—4s. 9d. to 5s. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—90s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.

POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.

POTASSIUM IODIDE.—B.P., 21s. 4d. to 24s. 4d. per lb., as to quantity.

POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—2s. 2d. per oz. for 1,000-oz. lots.

SACCHARIN.—43s. 6d. per lb.

SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.

SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.

SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.

SODIUM BENZOATE B.P.—1s. 7d. per lb.

SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb., for 28-lb. lots.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—73s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.

STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.

THYMOL.—Puriss, 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.

ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—8s. 9d. per lb.

AMYL ACETATE.—2s. 3d. per lb.

AMYL BUTYRATE.—4s. 9d. per lb.

AMYL CINNAMIC ALDEHYDE.—9s. per lb.

AMYL SALICYLATE.—2s. 9d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—3s. per lb.

BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—1s. 9d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.

BENZYL BENZOATE.—2s. 2d. per lb.

CINNAMIC ALDEHYDE NATURAL.—12s. 6d. per lb.

COUMARIN.—13s. per lb.

CITRONELLOL.—9s. per lb.

CITRAL.—6s. per lb.

ETHYL CINNAMATE.—8s. per lb.

ETHYL PHTHALATE.—2s. 6d. per lb.

EUGENOL.—7s. 6d. per lb.

GERANIOL.—7s. 3d. to 12s. per lb.

GERANIOL (FROM PALMAROSA).—17s. per lb.

HELIOTROPINE.—6s. per lb.

ISO EUGENOL.—9s. 6d. per lb.

LINALOL (EX BOIS DE ROSE).—5s. 6d. per lb.

LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.

METHY ANTHRANILATE.—7s. per lb.

METHYL BENZOATE.—4s. 3d. per lb.

MUSE XYLOL.—6s. 6d. per lb.

PHENYL ETHYL ACETATE.—10s. per lb.

PHENYL ETHYL ALCOHOL.—8s. 6d. per lb.

RHODINOL.—40s. per lb.

SAFROL.—2s. per lb.

VANILLIN, EX CLOVE OIL.—16s. to 18s. per lb. Ex Guaiacol.—14s. 3d. to 16s. 3d. per lb.

Essential Oils

ANISE OIL.—2s. 6d. per lb.

BERGAMOT OIL.—10s. per lb.

BOURBON GERANIUM OIL.—18s. 6d. per lb.

CAMPHOR OIL.—White, 105s. per cwt.

CANANGA.—Java, 7s. per lb.

CASSIA, 80/85%.—4s. per lb.

CINNAMON OIL LEAF.—4s. per oz.

CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. Pure Ceylon, 2s. per lb.

CLOVE OIL, 90/92%.—5s. 6d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 4d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 10s. per lb.

LEMON OIL.—4s. 6d. per lb.

ORAGE, SWEET.—8s. per lb.

PALMA ROSA.—9s. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, November 12, 1931.

THERE is a little better stability in the markets with prices continuing firm and in a number of cases tending towards higher levels. The demand has been fairly brisk with offers confined to near delivery.

General Chemicals

ACETONE.—Continues firm at £62 per ton with the market hardening. There is a good general demand.

ACID, ACETIC.—Quotations are firm at £36 5s. to £38 5s. per ton for Technical 80% with Pure 80% £37 5s. to £39 5s. per ton with a brisk demand.

ACID, CITRIC.—The demand is only for small quantities with the market remaining firm at about 1s. 1d. per lb. less 5%.

ACID, FORMIC.—An active demand has been received with supplies on the short side for early delivery. The market is higher at £46 to £48 per ton.

ACID, OXALIC.—Conditions continue firm with the market active at £42 to £43 per ton.

ALUMINA SULPHATE.—In good demand with the market inclined to harden at £8 10s. to £9 10s. per ton.

ARSENIC.—The scarcity of home material is still pronounced and the price nominal at £23 10s. per ton f.o.r Mines. Imported material is on offer at about £25 per ton c.i.f. U.K. ports.

BARIUM CHLORIDE.—An increased volume of business is being placed with conditions firm at £11 to £11 10s. per ton.

CREAM OF TARTAR.—Continues in fair demand at 86s. 6d. to 89s. 6d. per cwt. less 2½%.

FORMALDEHYDE.—Is a good market at £27 to £28 per ton with conditions firm.

LEAD ACETATE.—More interest is being shown in this product with prices firm at £37 to £39 per ton for White and Brown £1 per ton less.

LITHOPONE.—Conditions are firm with the market active at about £22 per ton.

BICHROMATE OF POTASH.—Continues in good request with the market firm at about 4¼d. per lb.

POTASH CHLORATE.—Supplies are rather short for early delivery and the market is active at £32 to £34 per ton.

PERMANGANATE OF POTASH.—Needle crystals B.P. in good request at 7d. per lb.

POTASH PRUSSIATE.—An active demand is being received and the market is firm at about 8½d. per lb.

SODIUM BICHROMATE.—In good demand with the market firm at 3½d. per lb.

SODIUM CHLORATE.—There is a brisk demand with the market inclined to firm at £28 to £32 per ton.

SODIUM NITRITE.—A moderate demand is being received with the market steady at £20 to £22 per ton.

ZINC SULPHATE.—In fair demand at about £11 to £12 per ton.

Coal Tar Products

There is no alteration in the prices of coal tar products from last week, and the market remains quiet.

MOTOR BENZOL.—Quoted at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 1½d. to 1s. 2d. per gallon f.o.r.

HEAVY NAPHTHA.—Unaltered, at about 11d. to 1s. 0½d. per gallon f.o.r.

CREOSOTE OIL.—Quoted at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Obtainable at about 1s. 6d. per gallon f.o.r. for the 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Unchanged, at about £2 5s. to £2 10s. per ton for firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Quoted at 60s. to 65s. per ton, f.o.b. East Coast port.

THE following additional market conditions are reported:—

CARBOLIC ACID.—There is a fair amount of inquiry to report, though prices to all intents and purposes are unchanged at 5¾d. to 6¼d. per lb. It is noticed that foreign buyers are apparently interested in purchasing at these prices.

CRESYLIC.—Here again a better under-tone is noticeable. Prices are substantially the same, pale 97 99% 1s. 7d. to 1s. 8d., 90/100% 1s. 10d. to 2s., according to quality, composition, etc. Special grades 2s. 2d. to 2s. 4d. per gallon.

METHYL SALICYLATE.—Business fairly brisk at new prices of 1s. 4½d. to 1s. 6d. per lb. according to quantity.

SALICYLIC ACID.—Unchanged at prices of 1s. 5d. to 1s. 6½d. for large and small quantities respectively.

TECHNICAL SALICYLIC.—In better demand from dyestuff makers indicating renewed activity in that direction.

VANILLIN.—Fair business is being put through at the present prices which are maintained in spite of the lower offers which have been circulated for second-hand material; indeed it is felt that these stocks must now be almost exhausted.

Latest Oil Prices

LONDON, November 11.—LINSEED OIL was flat. Spot, ex mill, £19; November, £16 5s.; December, £16 12s. 6d.; January-April, £17 10s.; May-August, £18 10s., naked. RAPE OIL was quiet. Crude, extracted, £30 10s.; technical refined, £32 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £22 10s.; refined common edible, £26 10s.; deodorised, £28 10s.; naked, ex mill. TURPENTINE was firm and dearer. American, spot, 48s. 3d. per cwt.

HULL.—LINSEED OIL, spot to December, closed at £17 5s.; January-April, at £17 12s. 6d.; May-August, at £18 10s. naked. COTTON OIL, Egyptian, crude, spot, £22 5s.; edible refined, spot, £25; technical, spot, £24 15s.; deodorised, £27, naked. PALM KERNEL OIL, crude, naked, f.m.q., spot, £24 10s. GROUNDNUT OIL, crushed/extracted, spot, £30 10s.; deodorised, £34 10s. SOYA OIL, crushed-extracted, spot, £20 10s.; deodorised, £24. RAPE OIL, crushed/extracted, spot, £29 10s.; refined, £31 10s. per ton. COD OIL, 17s. per cwt. TURPENTINE, American, spot, 51s. per cwt. CASTOR OIL, pharmacy, spot, 48s. 6d.; firsts, 43s. 6d.; seconds, 41s. 6d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—No large business was reported during the week and the market remains steady at about £5 5s. per ton f.o.b. U.K. port in single bags. *Home.*—Prices remain unchanged. Business for prompt delivery is always small at this time of year. It is understood that merchants and farmers are still purchasing for delivery in the Spring.

IMPORTED NITRATE OF SODA.—The prices mentioned in our last issue are still in force. It is understood that very little business has been done in this product.

BRITISH NITRATE OF SODA.—Purchases at this season are negligible, but general satisfaction is expressed that it is now possible to obtain the product of British manufacture.

NITRO-CHALK.—It is reported that merchants and farmers are commencing to cover their Spring requirements at the prices mentioned in our last issue.

South Wales By-Products

THERE is scarcely any change in South Wales by-product activities. The call for pitch is slightly better, but is still far below what was anticipated a few months ago. The road tar demand is moderate and fairly steady around about 13s. per 40-gallon barrel delivered. Refined tars continue to have a fair a steady call, with quotations for coke-oven and gasworks tar unchanged. Naphthas remain slow. Solvent has a small, sporadic demand, but there is scarcely any call for heavy. Creosote remains weak, but motor benzol is a fairly bright feature. Patent fuel and coke exports are slightly better. Patent fuel prices, for export, are:—19s. to 19s. 6d., ex-ship Cardiff; 18s. to 18s. 6d., ex-ship Swansea. Coke prices are:—Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 15s. to 17s. 6d.

Scottish Coal Tar Products

CONDITIONS show little or no alteration during the week. Coal tar pitch and refined tar are difficult to secure with values firmer, but other products are as last reported.

CRESYLIC ACID.—Business remains disappointing and quotations are irregular. Pale, 99/100 per cent., 1s. 5d. to 1s. 6d. per gallon; pale, 97/99 per cent., 1s. 3d. to 1s. 4d. per gallon; dark, 97/99 per cent., 1s. 2d. to 1s. 3d. per gallon; all f.o.r. works. High Boiling is firm at 2s. 9d. to 3s. 3d. per gallon.

CREOSOTE OIL.—Supplies of best grades are not too plentiful, but values are unchanged. Specification oils, 2¾d. to 3d. per gallon; washed oil, 3¼d. to 3½d. per gallon; gas works ordinary, 3½d. to 3¾d. per gallon; all f.o.r. makers' works in bulk.

BLAST FURNACE PITCH.—Controlled prices remain at 40s. per ton f.o.r. works,, and 45s. per ton f.a.s. Glasgow for export.

REFINED COAL TAR.—The value is firmer at 3¾d. to 4d. per gallon ex works naked, and distillers are not keen to sell.

WATER WHITE PRODUCTS.—There is slightly more inquiry but orders remain scarce. Motor Benzole, 1s. 3½d. to 1s. 4½d. per gallon; 90/160 Solvent, 1s. 2½d. to 1s. 3½d. per gallon; and 90/190 Heavy Solvent, 1s. 0½d. to 1s. 1½d. per gallon; all f.o.r. in buyers' rail cars.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Chas. Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, November 12, 1931.

EXPORT inquiries continue to be the mainstay of the Scottish heavy chemical market.

ACETONE.—B.G.S.—£61 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £25 per ton; crystals, £26 per ton; B.P. crystals, £34 per ton; B.P. powder, £35 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £42 to £43 per ton, ex store.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality. £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station.

ANTIMONY OXIDE.—Spot material obtainable at round about £36 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £25 10s. per ton, ex wharf. Spot material still on offer at £26 per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. to £11 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r works, or £4 12s. 6d. per ton, fo.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £38 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £35 to £36 per ton c.i.f. U.K. ports. Brown on offer at about £1 jer ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £27 per ton ex store.

POTASSIUM CHLORATE.—99¾/100% Powder.—Quoted £34 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUJ PERMANGANATE B.P. CRYSTALS.—Quoted 6½d. per lb. ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 8d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-toun lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £13 per ton; roll, £11 10s. per ton; rock, £10 5s. per ton; ground American, £9 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Ramsay Memorial Laboratory of Chemical Engineering

THE new Ramsay Memorial Laboratory of Chemical Engineering at University College, University of London, is to be opened on November 26 by H.R.H. Prince George. This laboratory is designed to provide a post-graduate training in the principles underlying the design, fabrication and operation of all kinds of chemical plant. Special features of the building are a large industrial laboratory, in which semi-large scale plant can be erected and tested, a well-equipped workshop in which plant units may be fabricated or repaired, a drawing office, and a general experimental laboratory. Special laboratories are devoted to the study of fluid flow, heat transfer, and the examination of fuels. Provision is also made for the original investigation of chemical engineering problems, either on a small or semi-large scale. Fifty post-graduate students will be accommodated. Its erection and equipment have been made possible by the generous contribution of a number of chemical and chemical plant manufacturers.

Researches at Mellon Institute

DR. Edward R. Weidlein, Director of the Mellon Institute of Industrial Research, Pittsburgh, Pa., announces that an Industrial Fellowship for research on moisture proofing and greaseproofing paperboards used in cartons and boxes has been established in that institution by the Robert Gair Co., of New York, N.Y. Recent progress in package merchandising has indicated, he points out, a growing need for paperboard containers with improved moistureproofing and greaseproofing qualities, and it is the hope of the Robert Gair Co., the donor of the fellowship, and of Mellon Institute that technically valuable advances will result from the studies which were begun on September 1. Dr. Marion D. Coulter has been appointed a Fellow of the Institute, to conduct these scientific investigations. He is a specialist in organic chemistry and during the period 1925-1930 held a Mellon Institute fellowship for the study of certain problems in cellulose technology.

An Industrial Fellowship has also been founded by the Green Bag Cement Co., of Pittsburgh, subsidiary of the Davison Coke and Iron Co. The investigational work of this fellowship, which will be carried on by Mr. Raymond C. Briant, will be concerned with studies of the chemical and physical properties of portland cement and with the development of certain new cement products. Mr. Briant goes to Mellon Institute from the United States Bureau of Standards, Washington, where he has been engaged in research under the auspices of the Portland Cement Association.

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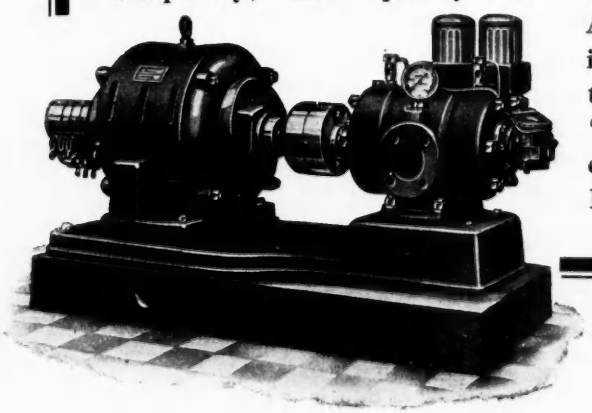

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Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, November 11, 1931.

Quotations are keeping remarkably steady in practically every line of chemicals, and very few cases of actual weakness have occurred on this market during the past week. With the continued improvement in the cotton textile industry there is an improved call for the products used in the finishing trades, and dyestuffs manufacturers, also, report a better movement. The position of imported materials is being very closely watched in the light of probable developments, and a fair volume of business is being put through. The demand for chemicals on this market for shipment during the past few days has been on a moderate scale.

Heavy Chemicals

Current offers of chlorate of soda range from about £31 to £32 per ton, with inquiry on moderate lines. A quietly steady business is being done in the case of saltcake, values of which keep firm at up to £3 per ton. Round £12 10s. per ton is being indicated for dibasic phosphate of soda, a fair demand for which has been experienced this week. Bicarbonate of soda maintains its firmness, quotations for this material being in the neighbourhood of £10 10s. per ton. There is a continued steady call for deliveries of caustic soda, contract quotations ranging, as before, from £12 15s. to £14 per ton, according to grade. The price position of bichromate of soda is unchanged at about 3½d. per lb. and buying interest is on a moderate scale. Only a relatively quiet demand has been reported in respect of prussiate of soda, quotations for which are well held at from 4⅞d. to 5¼d. per lb., according to quantity. There is some inquiry about in the case of sulphide of sodium, values of which keep up at round £8 per ton for the commercial quality, and up to £10 10s. for the 60-65 per cent. concentrated solid material. Hyposulphite of soda is steady and the demand is fairly active; the photographic grade is on offer at about £15 10s. per ton and the commercial at £9 5s. Alkali is firm at from £6 to £6 10s. per ton, and inquiry keeps up.

Pretty well all the potash materials are very strong from the point of view of prices, with caustic and carbonate both in moderate request at £38 10s. and £28 to £29 per ton, respectively. Yellow prussiate of potash continues on offer here at round 8½d. per lb., with the demand on quietly steady lines. There has been no particular feature about the market for chlorate of potash, quotations for which are at about £34 10s. per ton. Permanganate of potash is on the quiet side but prices are quite steady at round 6½d. per lb. for the B.P. material and from 6d. to 6¼d. for the commercial quality. Bichromate of potash meets with a fair volume of inquiry and values keep up at about 5½d. per lb.

There has been little if any improvement in the demand for sulphate of copper, and at a top figure of £18 per ton, f.o.b., quotations are not too strong. Business in arsenic is on quiet lines but in view of the pronounced scarcity, white powdered, Cornish makes, are extremely firm at about £26 per ton, at the mines, and foreign at £24. Buying interest in the acetates of lime is rather subdued, with offers of the grey quality at round £11 per ton and of the brown at £7 to £7 5s. Lead nitrate is quoted at from £28 10s. to £29 per ton, and the white and brown acetates at £35 and £34.

Acids and Tar Products

There is a quietly steady demand about in the case of citric acid and although not changed on the week prices keep steady at 1s. 1½d. per lb., with tartaric acid at about 1s. 0⅜d. per lb. Oxalic acid meets with a moderate inquiry, with current values at about £2 3s. per cwt., ex store. Acetic acid is well held at £51 per ton for the technical glacial quality, and £38 5s. for the commercial 80 per cent. grade.

Among the by-products, pitch is quoted at round 62s. 6d. per ton, f.o.b., a fair amount of activity being in evidence. Creosote oil is only in relatively quiet call but offers of this material are maintained at from 3½d. to 4½d. per gallon, according to quality. Solvent naphtha meets with a quiet demand at about 1s. 3⅜d. per gallon. Crystal carbolic acid is steady at from 5⅜d. to 6d. per lb., f.o.b., and crude 60's at up to 1s. 7d. per gallon, naked.

Company News

British Cyanides Co.—The net profit for the year ended June 30, 1931, is £2,928 (against £3,684); to which is added £529 brought forward from 1930, making £3,457, from which has to be deducted dividend for the year to Dec. 31, 1930, on the preference shares, together with Rock Investment Co.'s percentage thereon, amounting to £1,512, leaving the balance to be carried forward of £1945. The trading profit of the company and its subsidiaries exceeded that of the previous year, and the smaller profit shown is due partly to depreciation in stock values of proprietory moulding powders and mouldings, due to reduction in price, and to the decision to write off as obsolete the balance of plant installed some two years ago at Streetly Manufacturing Co., for generating current, as contract has now been made with local supply. The annual meeting will be held at Southern House, London, E.C.4., on November 18, at 12 noon.

Eastern Chemical Co.—The result of working for the year ended March 31, 1931, after maintaining plant out of revenue, and writing off in all £8,330 to depreciation, was a loss of £11,625 against a loss of £758 before depreciation last year. Plant account has been written down by £17,387 to bring amount down to revaluation figure, and this amount has been written off depreciation reserve account, thus reducing the latter to £7,230, plus £6,500 transferred from profit and loss, viz., £13,730.

Broken Hill South, Ltd.—The directors have declared a dividend of 1s. per share (5 per cent.), payable in Melbourne on December 23. This decision follows the chairman's intimation at the general meeting held in October that if the lead sales continued satisfactorily, a dividend would be paid before Christmas. The previous payment was 2½ per cent. in November, 1930. For the year to June 30, 1930, a total of 32½ per cent. was paid.

African Asbestos Trust Co.—For the year to June 30, 1931, the accounts show that £1,550 was expended on equipment and development and on general expenditure. The value of asbestos sold, together with sundry revenue, amounted to £2,036. Development and general expenditure account now stands at £74,896.

Claim Against a Chemical Company

Judgment for £832

In the King's Bench Division on Wednesday, Mr. Justice Rowlatt heard an action brought by L. Hervé, Ltd., Clerkenwell Road, London, against The Drug and Chemical Corporation, Ltd., Great Portland Street, for goods sold valued at £832 18s.

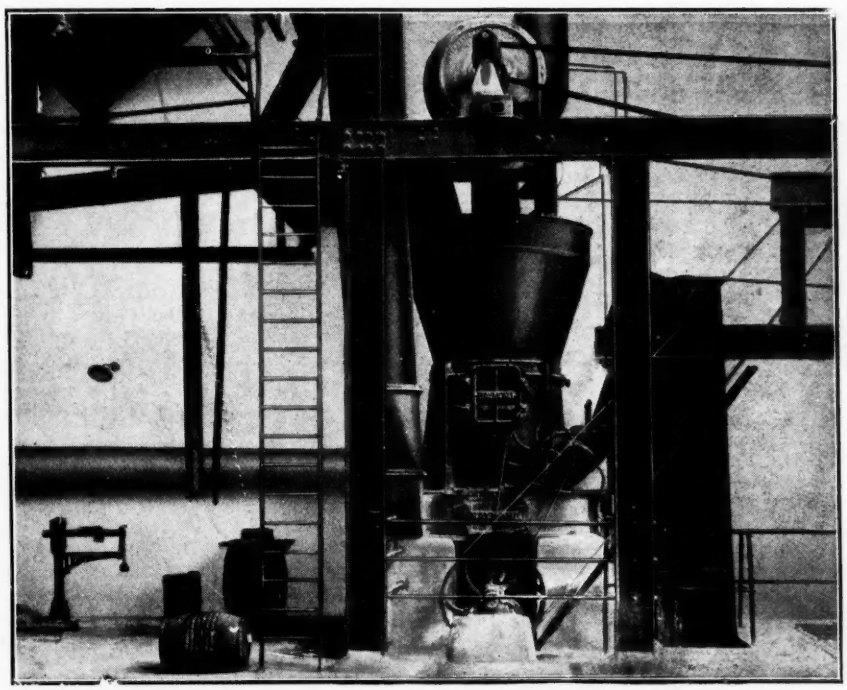
The plaintiffs were manufacturers of metal parts and in January, 1929, had an order from the defendants to supply 50,000 metal parts for insertion in sprays, or nasal douches, and the dispute arose, as to whether the price should be 18s. or 24s. per gross. The original contract was for 18s., but it was claimed that in consequence of certain improvements and alterations made in the size later, the defendants agreed to 24s. For a period of 18 months goods were supplied and invoiced at the increased price. Large sums were paid on account but it was not until December, 1930, that the figure was queried.

The defence was that it was orally agreed that in consideration of the defendants paying 24s. per gross for the original order, the plaintiffs would invoice any further orders in excess of that quantity at 18s.

His lordship, giving judgment for the plaintiffs for the amount claimed with costs, said that the evidence was overwhelmingly in their favour.

Overseas Chemical Trade

According to the statistics disclosed by the Board of Trade returns, imports of chemicals, dyes, drugs and colours during October totalled £1,590,763, as compared with £1,253,822 for October, 1930, an increase of £336,941. Exports totalled £1,456,328, as compared with £1,941,454 for October, 1930, a decrease of £485,126. Re-exports amounted to £62,600, whereas for October, 1930, they were £63,615.



EXCLUSIVE . . . TO THE RAYMOND MILL

The Raymond Roller Mill is being used exclusively in the United States for grinding CAUSTIC LIME for Beet Sugar Refining.

The above illustration is a typical arrangement of a 4 Roller Raymond Mill, which produces 2 Tons of Caustic Lime per hour to a fineness of 99% through 200 mesh. Total power absorbed being 85 B.H.P.

The Raymond Mill is absolutely DUSTLESS in operation.

BRITISH BUILT THROUGHOUT.

MINING & INDUSTRIAL EQUIPMENT LTD
ASSOCIATED WITH — INTERNATIONAL COMBUSTION LTD.
11, Southampton Row, London, W.C.1.
Works: Derby & Erith.

Commercial Intelligence

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ROWE, CLIFFORD D., Ael-y-bryn, Morriston, works chemist. (C.C., 14/11/31.) £17 15s. 8d. October 7.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

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UNIVERSAL ASBESTOS MANUFACTURING CO., LTD., Watford. (M., 14/11/31.) Registered October 27, debenture and a Land Registry charge, to Barclays Bank, Ltd., securing all moneys due or to become due to the bank; general charge and charged on land in Tolpits Lane, Watford.

London Gazette, &c.

Winding-Up Petition

LEEDS CHEMICAL CLEANING WORKS, LTD. (W.U.P., 14/11/31.) A petition for the winding-up of this company by the County Court of Yorkshire was on November 3, 1931, presented to the Court by Jack Hird, of 1167 Grangefield Avenue, Thornbury, Bradford, and Albert Chippindale, of "Elsworth," Park Gate, Guiseley, and is to be heard at the County Court House, Albion Place, Leeds, on November 27, 1931, at 10.30.

New Companies Registered

HICKSON & WELCH, LTD. Registered November 7. Nominal capital £2,000 in £1 shares. Manufacturers of and dealers in all kinds of organic and inorganic chemicals, dyes, gases, drugs, fertilisers, salts, acids, etc. Directors: B. Hickson and G. S. M. Coldbeck-Welch.

New Chemical Trade Marks

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to December 4, 1931.

SILANOVA.

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LEDMET.

525,694. Class 1.—Paints, pigments, colours, enamels (in the nature of paints), stains for wood, mineral dyes, lacquers, anti-corrosive oils, and varnishes. Goodlass Wall and Co., Ltd., 42 Seel Street, Liverpool, paint, colour and varnish manufacturers.—September 14, 1931.

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BRITISH INDIA.—The India Stores Department, New Delhi, is calling for tenders, to be presented in New Delhi by November 30, for the supply of turpentine and rosin. (Ref. B.X. 7185.)

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IMPORTS of tung oil into the United States for August, 1931, totalled 12,260,728 lbs., having a value of $638,316 as compared with 13,628,774 lbs., for a value of $1,220,999 imported during August, 1930. For the first eight months of 1931, total importations reached 56,027,392 lbs., valued at $3,232,207, as against 94,609,871 lb., valued at $8,705,331 for the corresponding months of 1930.

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